A PEOPLE'S TRUST FOR ENDANGERED SPECIES PUBLICATION

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Great Stag Hunt III

National stag beetle survey 2006-2007

Written by Matthew Smith

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Picture credits: cover, male stag beetle on left, Carim Nahaboo; larva in centre, Peter Cox; male in centre, PTES volunteer; female on right, Geoff Willson; p2, Lukas Jeker; p3 Tim Green; p15 Becky Hales; p18 PTES volunteer; p19 Claire-Louise Park.

Copies of the 1998 and 2002 National Stag Beetle Survey Reports can be downloaded as pdfs from www.ptes.org.
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Overview

The People's Trust for Endangered Species (PTES) has been funding and carrying out research and conservation work on endangered species around the world for over three decades. In that time we have devoted ever more of our efforts and funds to work here in the UK. We no longer have the megafauna that draws people to Africa and Asia, and as an island the diversity of our animals is substantially less than on the continent. This is why it's even more important that we work now to ensure a future here for those species we do have.

As we move into the second decade of the new millennium there is little respite for the natural world. The problems caused by habitat destruction and fragmentation are well documented and continue at an alarming rate. The changing climate will also have far-reaching impacts on many of our species and habitats, in particular those animals with more complex adaptations to life such as hibernation and migration. It is now more important than ever to consider the range of threats facing our biodiversity.

PTES is at the forefront of tackling these issues. As well as being instrumental in work on mammals we play a crucial role in conserving some of our lesser-known species too, including several invertebrates. PTES is the lead partner in the national Biodiversity Action Plans (BAPs) for the stag beetle, violet click beetle and noble chafer beetle. For all these species we are working with experts and volunteers to learn more about their life histories, what threats they face, where these species still remain and how we can ensure a future for them.

This report details the efforts of thousands of volunteers who sent in records of stag beetles across the country during 2006 and 2007 as part of our effort to raise awareness of our largest terrestrial beetle, and to produce an up-to-date map of the species' current distribution. All the records that have been sent to PTES have been checked, collated and compared with the previous distribution maps we have. Reassuringly the core range for stag beetles appears to be stable. Some of the known outlying populations like Cardiff and the Severn Valley are still present. Of particular interest were the records, backed up by photos, of stag beetles in Bristol, Bath, Hereford and from Stockport in Cheshire. The records from Stockport are one of the most northerly confirmed records we have for this species in the UK.

Our work protecting species has expanded to include looking after the precious and precarious habitats that sustain them. Our work creating an inventory of all the traditionally-managed orchards in England and Wales continues and will enable us to secure a future for noble chafer and other orchard-dwelling species. Meanwhile we are also protecting another habitat of great importance to hundreds of species: hedgerows. They are vital for dormice, other small mammals and so many other creatures and plants, including stag beetles. By continuing to engage people in practical conservation, as well as monitoring our endangered species, we can all help protect our wildlife for the future.

Nida Al Fulaij
Development Manager, PTES

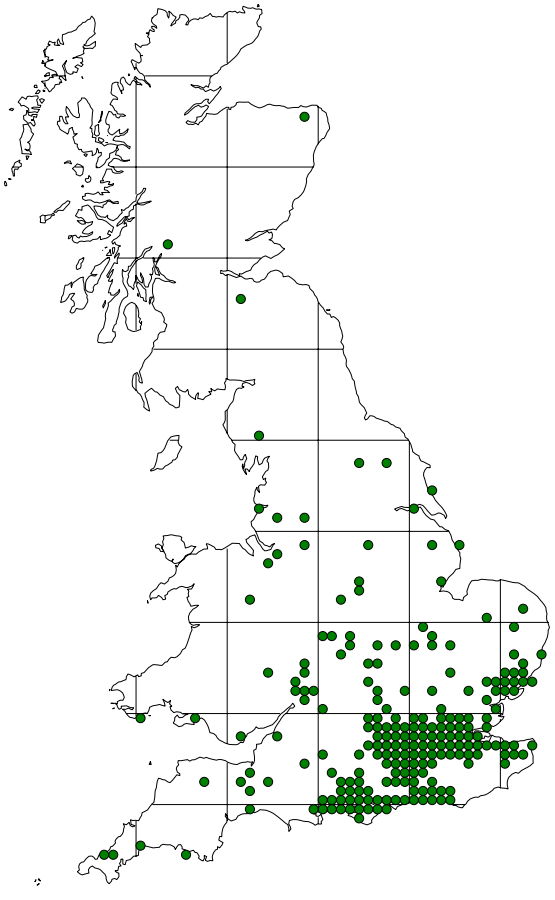
Introduction

The stag beetle *Lucanus cervus* is Britain's largest terrestrial beetle. Adult males can reach up to 70mm in length and are easily recognised by their prominent 'antlers', actually greatly enlarged mandibles. Stag beetle larvae develop underground, feeding on decaying wood. The larvae take at least three years to develop but can take as long as seven. Female beetles burrow downwards beneath the surface of the ground to lay their eggs in the soil alongside decaying timber. Larvae can be found either in large galleries they have excavated within the wood or in the soil in close proximity, feeding on the wood from the outside. When mature, the larvae construct a large, hollow, pupal cell in the soil before transforming inside this into a pupa. The adult beetles emerge from their pupae in late summer, passing the winter underground in their pupal cell in a state of torpor. Adult beetles leave their pupal cells and dig their way to the soil surface in late spring or early summer.

The stag beetle *Lucanus cervus* has been recorded throughout much of Western Europe, though in a number of countries it is now thought to be very rare or even extinct. As a consequence, stag beetles have been included on Schedule II of the EC Habitats Directive and are classed as a 'European Protected Species'. Legislation giving the species protected status has been enacted throughout the EU. In the UK, stag beetles are classified as Nationally Scarce (Hyman & Parsons 1992) and were listed on Schedule 5 of the Wildlife & Countryside Act in 1998, making it illegal to trade in the species without an appropriate licence. Stag beetles were included in the first tranche of Species Action Plans (SAP) produced by the UK Biodiversity Group in 1995.

In 1998 PTES became the Lead Partner for the stag beetle SAP and organised the *Great Stag Hunt*, the first national UK stag beetle survey. This was very successful, resulting in the production of up-to-date UK distribution maps for the species (Percy et al. 1999). *Great Stag Hunt II*, the second national survey, was carried out in 2002, when it was hoped that the offspring of beetles seen in 1998 would emerge. The results of this survey were published by PTES in 2003 (Smith 2003), and data from both the 1998 and 2002 surveys have been uploaded to the National Biodiversity Network Gateway (www.NBN.org).

This report details the results of *Great Stag Hunt III*, the third national survey. This survey was originally planned to take place in 2006 following the sequence of the earlier surveys in 1998 and 2002, but additional funding provided by Natural England allowed the survey to be extended into 2007. The results for both years are reported here and the data has been uploaded to the NBN Gateway.



MAP 1

2006 stag beetle records received by 10km^2, all categories.

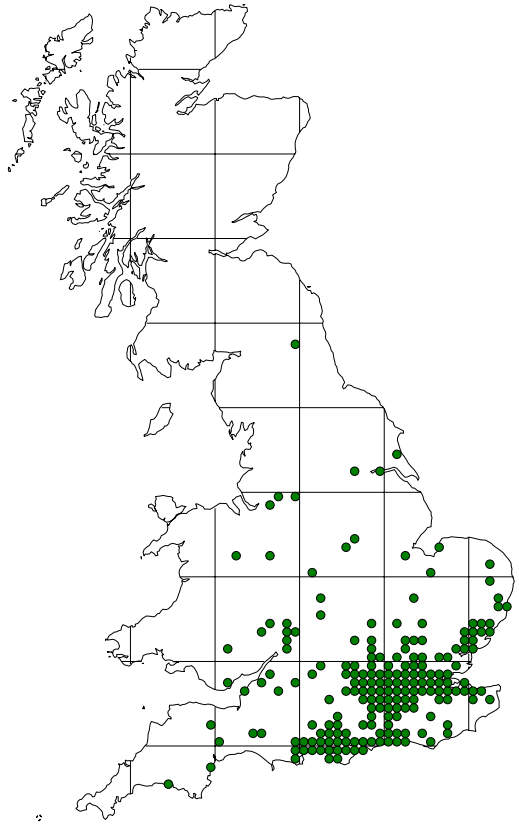
Method

***Great Stag Hunt III* once again asked people to send details of their sightings of stag beetles to PTES. A paper recording form was produced and widely distributed via organisations such as local authorities and the Wildlife Trusts. Participants from the 1998 and 2002 surveys were either mailed a recording form (appendix two), which was also made available as a download from the PTES website, or emailed and invited to participate online (appendix three).**

In 1998 and 2002 recorders had the option to e-mail in sightings to PTES. For GSH III, PTES produced a dedicated *Great Stag Hunt* website so recorders could enter their sightings online, and upload photographs of their sightings along with their records. Each record was validated and assigned to one of two categories. Category 1 records are those considered to be definite records for the stag beetle. Category 2 records are those where there was some doubt as to their validity. The availability of the GHS III website was useful in attracting recorders away from the main stag beetle strongholds and achieving a wider geographical spread of records than was seen in 1998 and 2002, although the 24 overseas records that were received had to be discounted for obvious reasons.

MAP 2

2007 stag beetle records received by 10km², all categories.



When validating records, factors taken into consideration included the size of the beetle, colour, behaviour and location of the record. In some instances, follow up calls were made to recorders to obtain more information on particular sightings, particularly those away from the main areas of distribution. Larval records proved the most difficult to validate. When young, stag beetle larvae are very similar in size and appearance to the larvae of other related beetle species such as the lesser stag beetle *Dorcus parallelipipedus* or the cockchafer *Melolontha melolontha*. Most records were submitted with locality details including a postcode. Grid references were obtained using a combination of Ordnance Survey maps, the Gazetteer of Great Britain (Ordnance Survey 1999) and online resources (www.streetmap.co.uk & www.mapinfo.co.uk).

A number of records were given category 1 status despite being submitted with incomplete locality details. The information provided with these records is sufficient to confirm these records are definitely those of stag beetles. While these records cannot be used when compiling distribution maps, the remaining information included in the records (e.g. the date of the sighting, the sex of the beetle and any behaviour noted) can be used when analysing these various categories.

751 records were submitted with accompanying photographs, 640 of these were attached to records submitted via the website. These proved very useful, particularly when validating records of beetles, especially those emanating away from the core population areas, or when trying to distinguish between records of small female stag beetles and large lesser stag beetles.

Data for the all of the surveys is held on a Lotus Approach database and is stored in tables in dBase format (.dbf). In total the database holds just over 21,500 records. Distribution maps were produced using DMAP mapping software.

Results

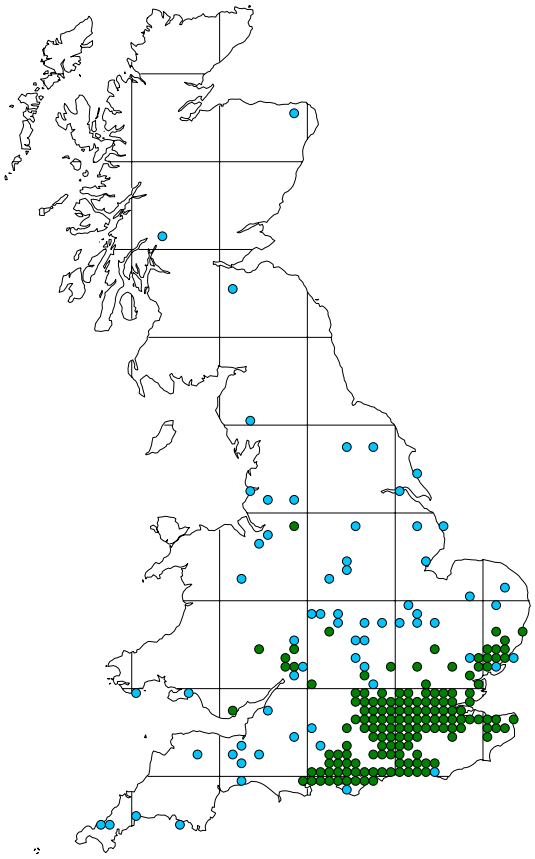
A total of 8,130 records were received. 4,756 records referred to 2006 sightings (Map 1), with 3,374 records listing sightings made in 2007 (Map 2). 3,535 recorders submitted records. 3,593 records arrived on paper recording forms, with another 4,537 being submitted via the website.

Overall, 4,296 records were classed as category 1 and 291 as category 2 in 2006 (Map 3). In 2007, 3,058 records were classed as category 1 and 205 as category 2 (Map 4).

In addition to positive stag beetle records, 172 'Nil' records were received from recorders giving information on localities where they had not recorded any beetles. Records of this type are very useful when compiling distribution maps. The locations for these records are plotted on Maps 5 and 6.

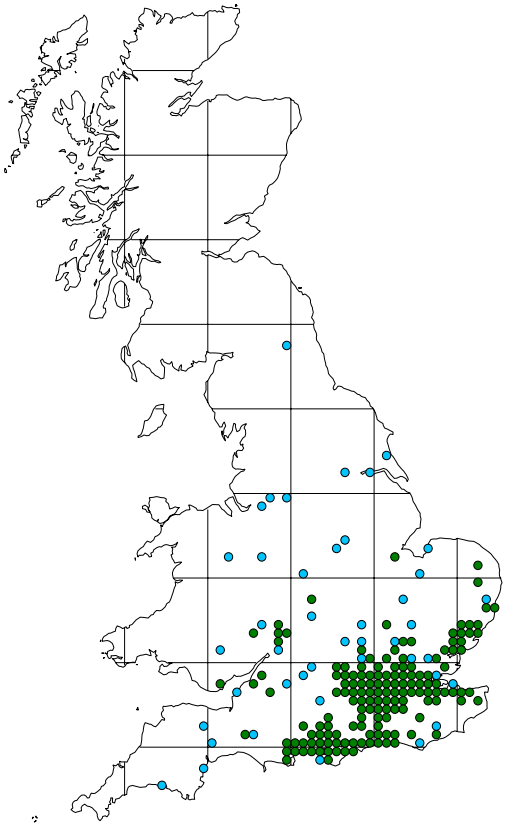
Not all of the photographs received were of stag beetles. Species identified or partly identified with the aid of photographs included the lesser stag beetle, the cockchafer, dung beetles *Geotrupes* sp., the rhinoceros beetle *Sinodendron cylindricum* and the sawyer beetle *Prionus coriarius*. Of most interest were the two records we received for *Prionus*. This very large longhorn beetle is classed as Nationally Scarce (A) and is very infrequently recorded. These records will be passed onto the National Longhorn Recording Scheme and all of the records for these other species uploaded to the NBN Gateway. A summary of the numbers of records received and the various species identified in the 2006 and 2007 surveys is shown in Table 1.

With the completion of the 2007 survey, PTES has now organised national stag beetle surveys covering four of the nine years since the stag beetle SAP began in 1998. *Great Stag Hunt III* received a total of 7,354 category 1 stag beetle records, 4,296 in 2006 and 3,058 in 2007. Both these totals are higher than that for the 2002 survey, though still much less than the numbers collected from the 1998 survey (Table 2).



MAP 3

2006 stag beetle records received by 10km².
- *Cat. 1*
- *Cat. 2*



MAP 4

2007 stag beetle records received by 10km².
- *Cat. 1*
- *Cat. 2*

MAP 5

LEFT: 2006 stag beetle survey 'nil' records received by 10km^2.

KEY:

Nil records

MAP 6

RIGHT: 2007 stag beetle survey 'nil' records received by 10km^2.

KEY:

Nil records

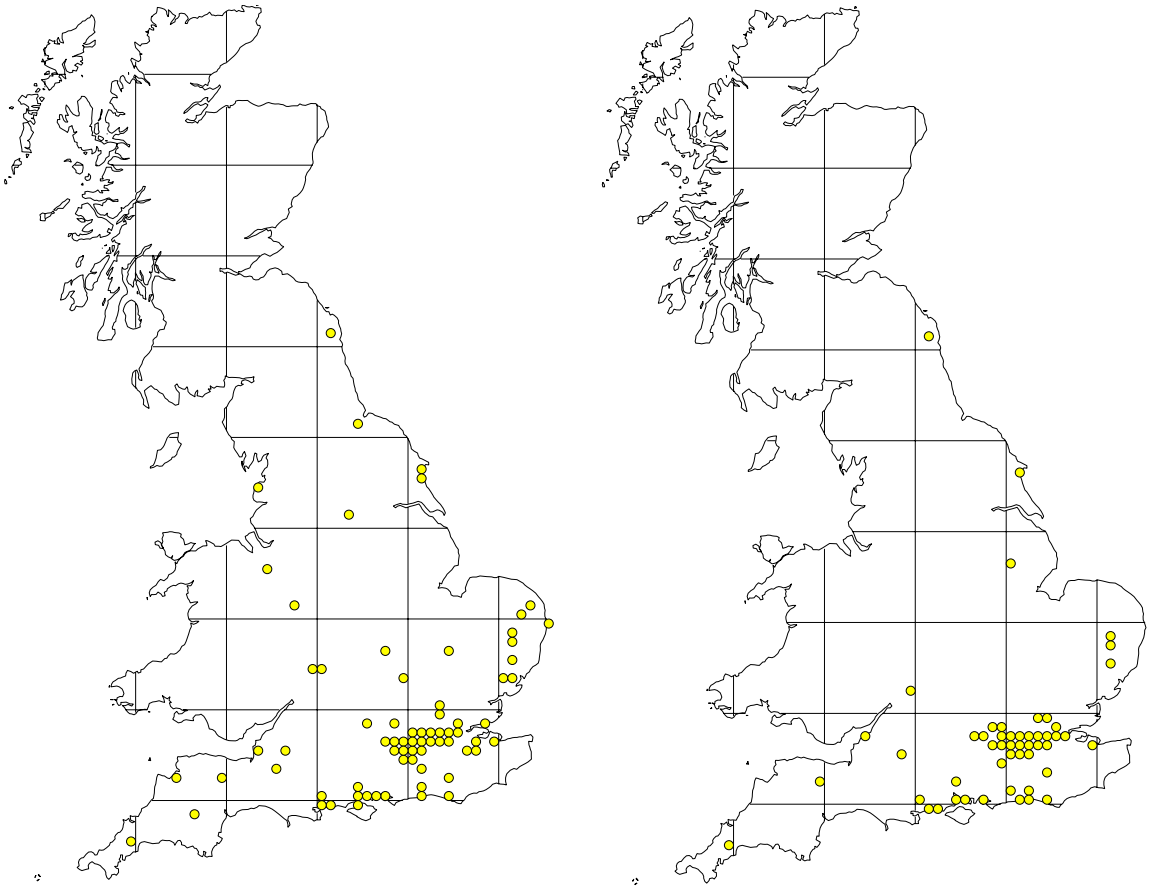


TABLE 1

Great Stag Hunt III summary of records received.

Record received	2006	2007
Stag beetle - *Lucanus cervus*		
Stag beetle records - category 1	4,296	3,058
Stag beetle records - category 2	291	205
'Nil' records	100	72
Total stag beetle records	4,687	3,335
Other species		
Lesser stag beetle - *Dorcus parallelipipedus*	59	36
Dung beetle - *Geotrupes* sp.	0	2
Cockchafer - *Melolontha melolontha*	7	1
Sawyer beetle - *Prionus coriarius*	2	0
Rhinoceros beetle - *Sinodendron cylindricum*	1	0
Survey total	4,756	3,374

TABLE 2

Records received from national stag beetle surveys since 1998.

Year	No. of recorders	No. of records
1998	3,600	9,381
2002	1,200	2,830
2006	2,018	4,296
2007	1,471	3,058

The number of category 1 records received from each county in 2006 and 2007 is shown in Table 3. For comparative purposes, Table 3 also includes the number of county records from the 1998 and 2002 surveys.

Table 4 shows the same data expressed as a percentage of the total number of records received for each survey year.

TABLE 3

Number of category 1 stag beetle records received by county.

County	1998	2002	2006	2007
Avon	4	-	-	3
Bedfordshire	1	1	2	1
Berkshire	662	228	455	323
Buckinghamshire	193	51	71	36
Cambridgeshire	-	1	-	-
Cheshire	-	-	3	-
Clwyd	1	-	-	-
Cornwall	1	-	-	-
Devon	12	2	-	-
Dorset	636	193	247	205
Dyfed	1	-	-	-
East Sussex	8	14	20	6
Essex	538	131	300	240
Gloucestershire	3	1	15	3
Greater London	2,936	817	962	717
Hampshire	950	338	668	386
Hereford & Worcester	17	10	7	11
Hertfordshire	62	7	21	10
Kent	464	271	182	169
Lincolnshire	-	1	-	1
Norfolk	-	5	-	2
Oxfordshire	176	36	41	51
Somerset	4	-	-	1
South Glamorgan	2	2	1	1
Suffolk	857	124	212	164
Surrey	1,295	356	774	410
Warwickshire	-	1	1	1
West Glamorgan	2	-	-	-
West Sussex	547	231	226	261
Wiltshire	9	6	-	1
Yorkshire	-	3	-	-
No locality data	-	-	88	55
Total	9,381	2,830	4,296	3,058

Distribution

The data in Tables 3 and 4 are based purely on the number of records received from each county. Although there are some wide fluctuations in the numbers of stag beetles recorded from some counties, it is impossible to ascertain any trends in the population from this data. Although apparent fluctuations can be seen, we can not be sure if these are due to real changes in the population of stag beetles, or are in fact only a reflection of the differing levels of recorder numbers or records received from each survey. What this data does provide however, is a substantial base of records that can be used to look at the distribution of stag beetles in geographical terms.

As is to be expected, the number of hectads from which stag beetles have been recorded varied between the surveys (Table 5).

Great Stag Hunt III recorded stag beetles from a total of 185 hectads in the UK. Overall, the distribution of records for 2006 and 2007 is very similar to that seen in 1998 and 2002, with the majority of stag beetle records coming from south-east England. The small population centred on Upton-on-Severn on the Gloucester/Worcestershire border is still present, as is the population in Cardiff.

Away from the main areas of distribution, 2006 saw records arriving from the Hereford area and Warwickshire. The most northerly records came from Cheshire, where photographs were received of both male and female beetles from a garden in Stockport. 2007 once again saw records arriving from Avon and Somerset, with further records from Herefordshire, Norfolk and Lincolnshire.

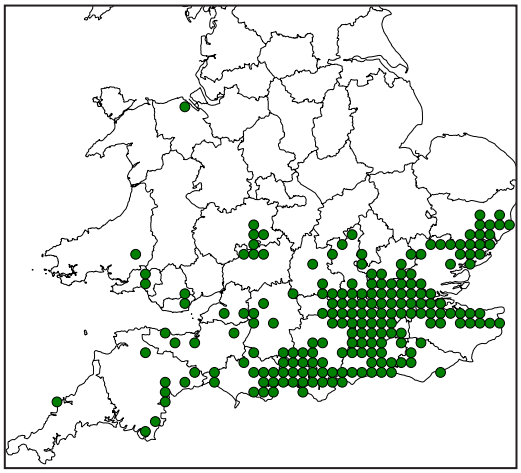
MAPS 7- 10

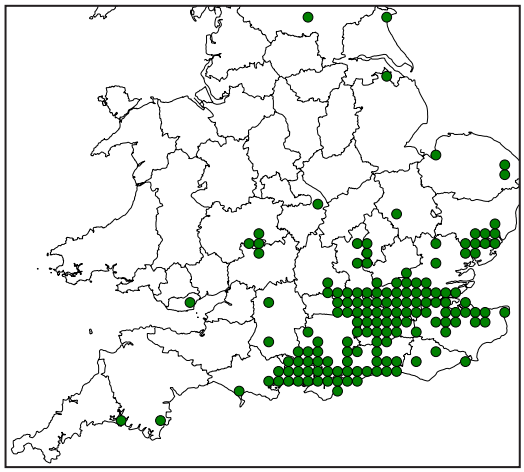
TOP LEFT:
Map 7 1998 stag beetle records by 10km².

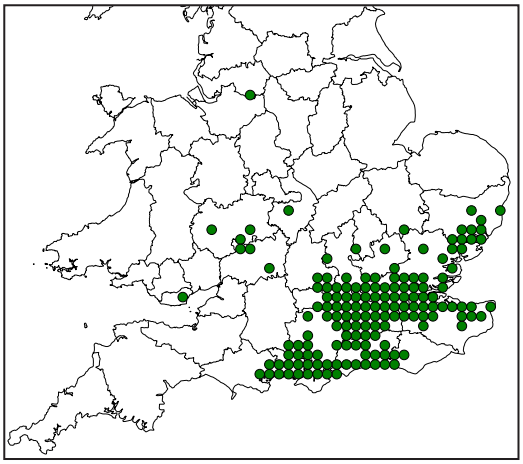
TOP RIGHT:
Map 8 2002 stag beetle records by 10km².

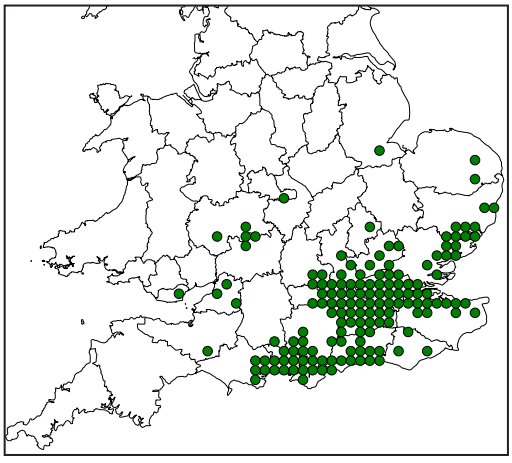
BOTTOM LEFT:
Map 9 2006 stag beetle records by 10km².

BOTTOM RIGHT:
Map 10 2007 stag beetle records by 10km².









County	1998	2002	2006	2007
Avon	0.04	-	-	0.10
Bedfordshire	0.01	0.04	0.05	0.03
Berkshire	7.06	8.06	10.81	10.76
Buckinghamshire	2.06	1.80	1.69	1.20
Cambridgeshire	-	0.04	-	-
Cheshire	-	-	0.07	-
Clwyd	0.01	-	-	-
Cornwall	0.01	-	-	-
Devon	0.13	0.07	-	-
Dorset	6.78	6.82	5.87	6.83
Dyfed	0.01	-	-	-
East Sussex	0.09	0.49	0.48	0.20
Essex	5.73	4.63	7.13	7.99
Gloucestershire	0.03	0.04	0.36	0.10
Greater London	31.30	28.87	22.86	23.88
Hampshire	10.13	11.94	15.87	12.85
Hereford & Worcester	0.18	0.35	0.17	0.37
Hertfordshire	0.66	0.25	0.50	0.33
Kent	4.95	9.58	4.33	5.63
Lincolnshire	-	0.04	-	0.03
Norfolk	-	0.18	-	0.07
Oxfordshire	1.88	1.27	0.97	1.70
Somerset	0.04	-	-	0.03
South Glamorgan	0.02	0.07	0.02	0.03
Suffolk	9.14	4.38	5.04	5.46
Surrey	13.80	12.58	18.39	13.65
Warwickshire	-	0.04	0.02	0.03
West Glamorgan	0.02	-	-	-
West Sussex	5.83	8.16	5.37	8.69
Wiltshire	0.10	0.21	-	0.03
Yorkshire	-	0.11	-	-
No locality data	-	-	2.09	1.83
Total	100	100	100	100

TABLE 4

Percentage of category 1 stag beetle records received by county.

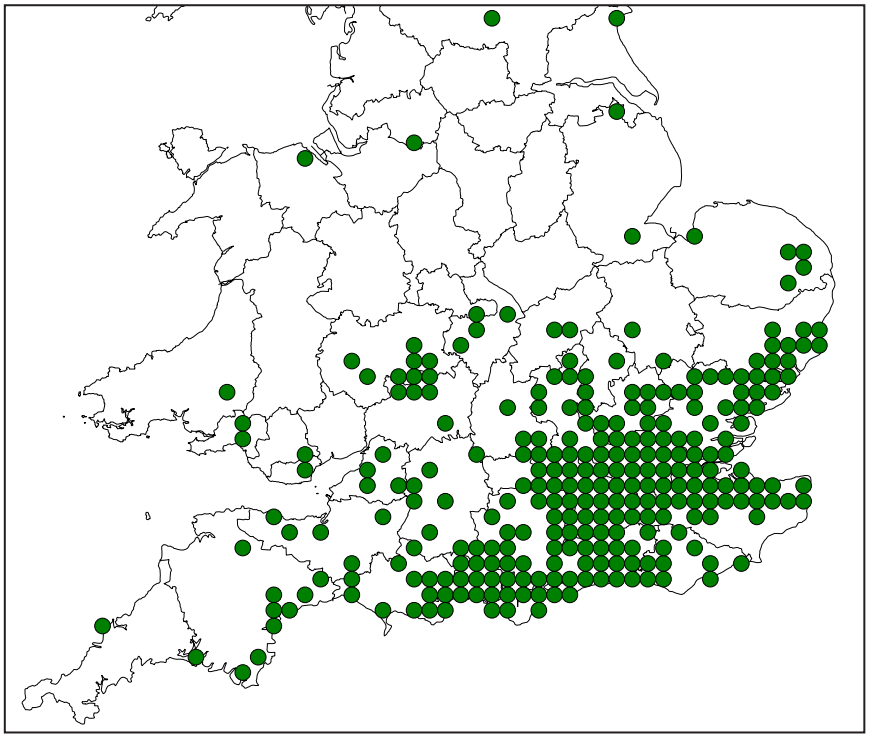
Year	Number of records	Number of hectads with records	Cumulative no. of hectads with records
1998	9,381	197	197
2002	2,830	150	229
2006	4,296	153	249
2007	3,058	152	267
All surveys	19,565	267	267

TABLE 5

National stag beetle surveys since 1998, number of hectads with records.

MAP 11

UK stag beetle distribution 1998 – 2007 by 10km square.



Combining the four survey datasets gives a total of 267 hectads from which stag beetles have been recorded. Including other records collated by PTES (e.g. Drane 2001), stag beetles have been recorded from a total of 272 hectads in England and Wales since 1998. A cumulative distribution map including all of these records is shown in Map 11.

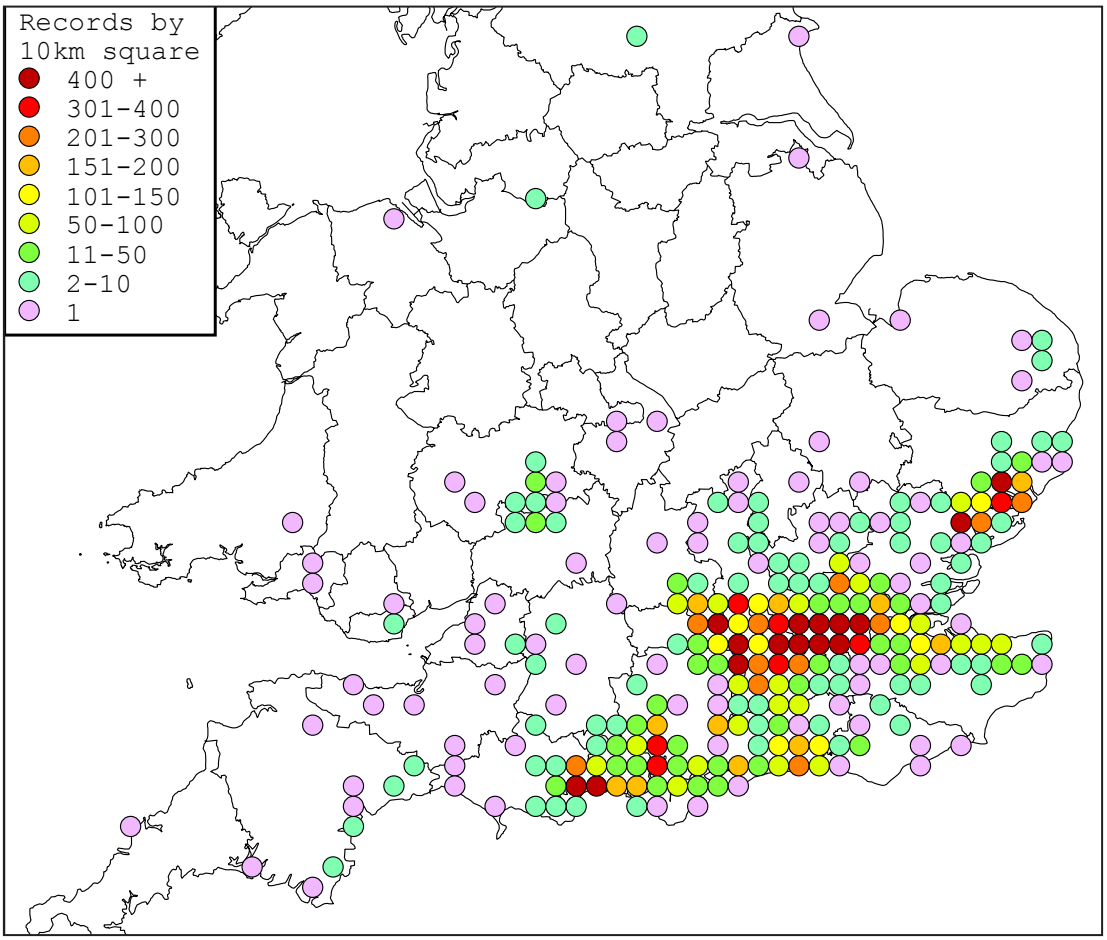
While Map 11 shows the number of hectads where stag beetles have been recorded over one or more national surveys, it gives no indication of the number of records per hectad that underlie this data. Map 12 shows the number of records by 10km square.

The number of records per 10km square ranges from 1 to 735. It is usual with maps of this type to divide the data into equally sized ranges. In this instance, each of the nine ranges would span 81 different values. In order that hectads with one or very few records are easier to identify and are not 'lost' against a background of 10km squares containing up to 80 records, in this instance the category divisions are unequal.

As in 1998 and 2002, the majority of records (83%) came from private gardens, with a further 16% coming from associated areas such as pavements, roads, town centre shopping areas and urban parks and greenspaces, suggesting that stag beetles are, in the UK at least, very much associated with urban areas. 'Hotspots', where large numbers of beetles have been recorded, include areas of south London, parts of Ipswich, Colchester, Brighton and Bournemouth, together with parts of Berkshire and Surrey.

The distribution maps produced for the GSH II report in 2003 showed 110 10km squares where the beetle had been recorded only once during the 1998 and 2002 national surveys. Map 12 shows 112 hectads where stag beetles have only been recorded once over the four surveys between 1998 and 2007.

Smith (2003) noted that '*there is often some debate as to whether stag beetles recorded away from their main (or expected) areas of occurance in south-east England are properly resident or not. Within the entomological literature, many such records are accorded dubious status on the grounds that no local 'breeding populations' are known, or that the beetle is an 'accidental' or 'vagrant' specimen*. It would seem unlikely that this increasing number of singleton hectad records are all entirely due to vagrant individuals that have somehow been



MAP 12

National stag beetle surveys 1998-2007, number of records by 10km square.

transported from areas where stag beetles are more common. While this may be true of one or two individuals, the data would suggest that there are indeed small, localised populations of stag beetles present in these areas.

Although Maps 11 and 12 show the overall distribution of stag beetles between 1998 and 2007, they give a limited indication as to the areas of the country where the species is regularly recorded or areas where the species is only occasionally seen. Analysing the survey data shows from how many surveys the species has been recorded in a particular 10km square. The results are illustrated in Table 6 and the data is shown in Map 13.

Map 13, overleaf, indicates that the core areas for the UK stag beetle population (i.e. those 107 hectads where stag beetles have been recorded during all four national surveys) are mostly to be found in south-east England.

Recorded from	Number of hectads
4 Surveys	107
3 Surveys	15
2 Surveys	33
1 Survey	112

TABLE 6

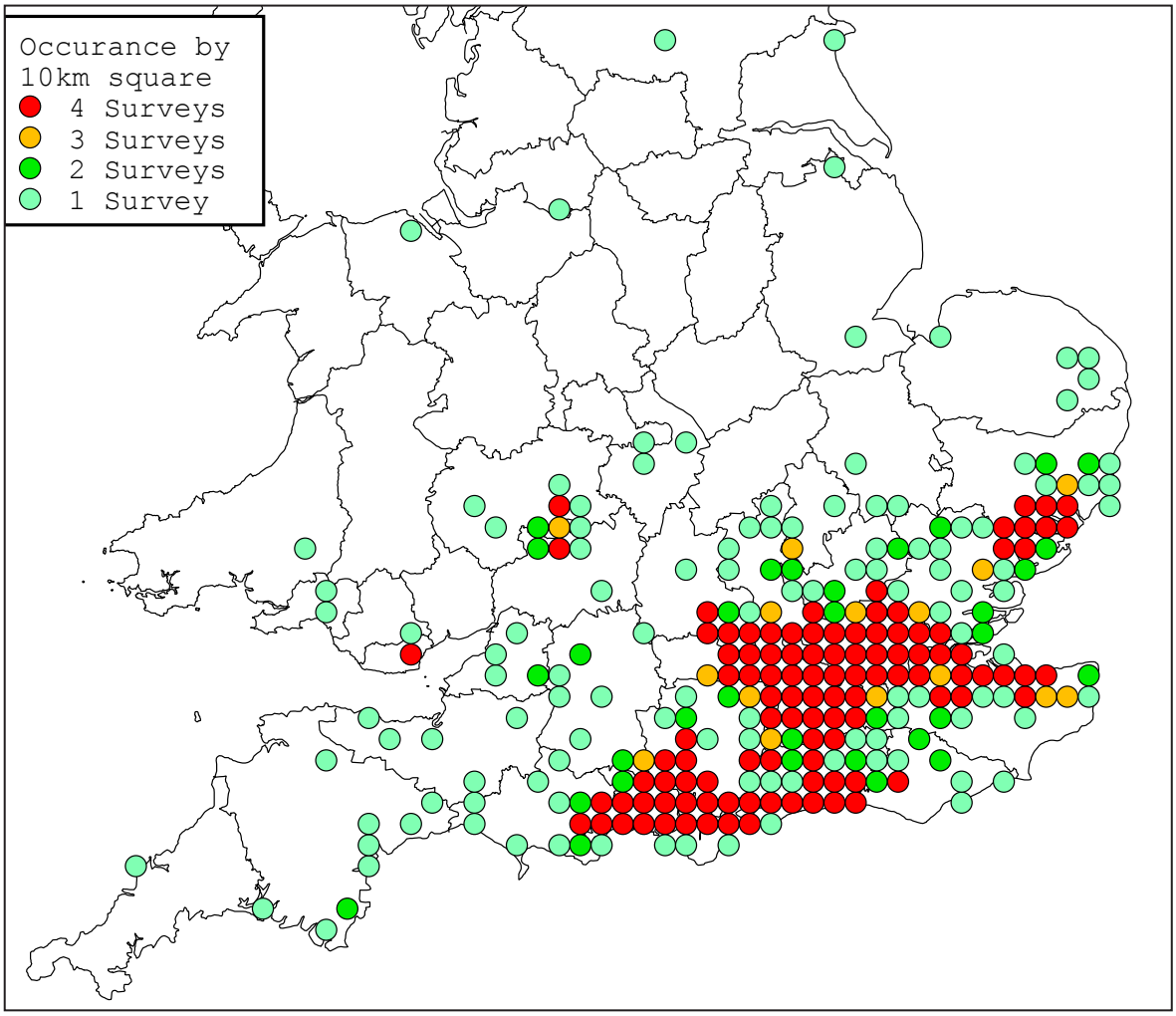
National stag beetle surveys 1998-2007, number of hectads with records.

Outside of these areas, the species is patchily distributed across England and south Wales, north to Yorkshire.

Within the south-east of England, three main areas of population can be identified. One includes parts of southern Suffolk and north Essex, with a second covering the Bournemouth/New Forest/southern Hampshire area. This is linked along the south coast to the very large central core of distribution. This extends westwards from central Berkshire along the Thames Valley and

MAP 13

UK stag beetle distribution 1998 – 2007 by 10km square.



includes much of Greater London, Surrey and parts of West Sussex, extending eastwards along the north coast of Kent.

Away from the south-east, two much smaller population blocks area can be observed. The smallest of these is the population in Cardiff in south Wales. This would appear to be restricted to a single 10km square in urban Cardiff, with only one or two records per survey coming from this population. The population in the Severn Valley along the Gloucester/Worcestershire border occupies 10 hectads, with records from all four surveys coming from two of them. Within these two hectads, records received ranged from one to thirteen per survey.

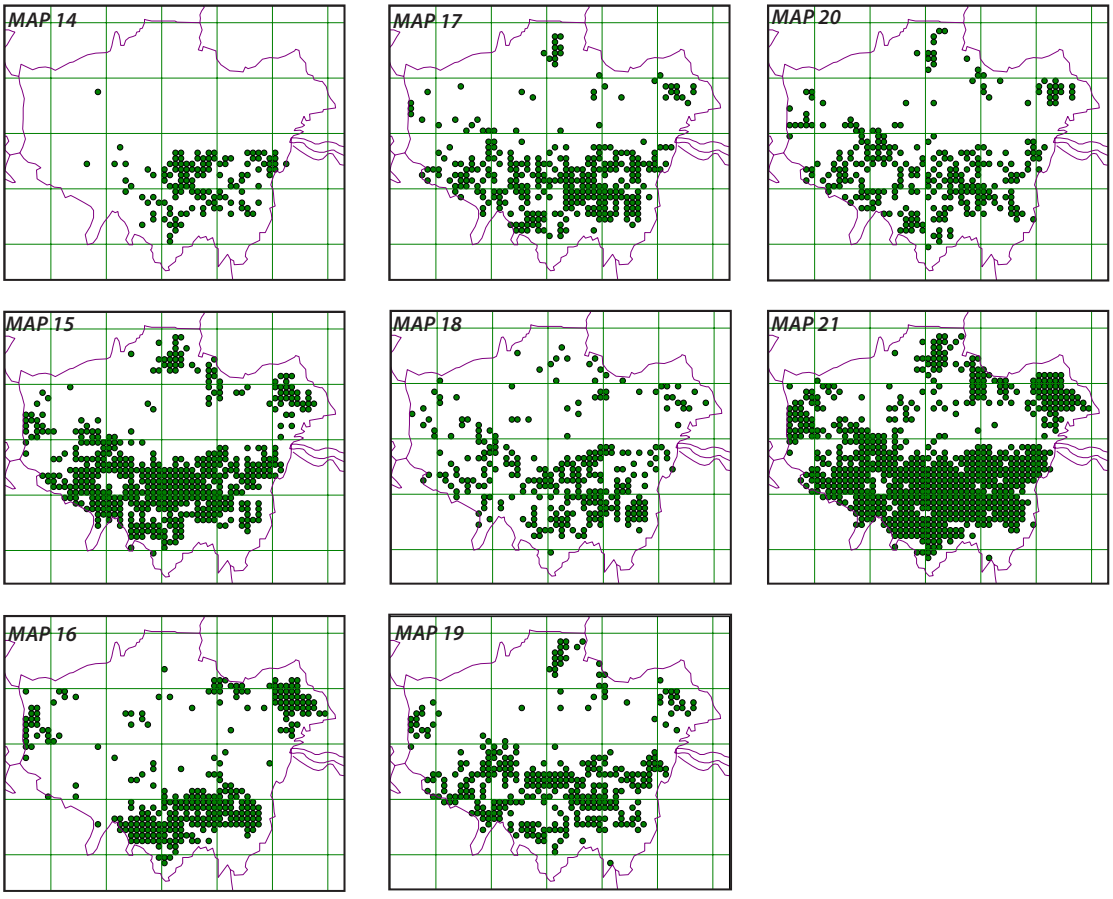
Given that the cumulative number of hectads occupied by stag beetles has increased with each survey (Table 5, page 10), the data presented in Map 13 would appear to suggest that these core population areas have remained stable between 1998 and 2007. There is little or no evidence to suggest any contraction in range. All of the three large south-east blocks appear to be very solid with little evidence of gaps or areas where stag beetles have not been observed on fewer than four occasions. Where these do occur, they are mostly around the margins of the core areas.

Further evidence that the range of the species has remained stable, at least in the Greater London area, comes from stag beetle surveys organised by the London Wildlife Trust (LWT) in 1997, 1999 and 2005. Combining the LWT data with that collected by PTES during the four national stag beetle surveys gives the results in Table 7. This data is mapped in Maps 14 – 21 below.

Year	Number of 1km squares with records
1997 LWT survey	130
1998 PTES survey	514
1999 LWT survey	302
2002 PTES survey	325
2005 LWT survey	287
2006 PTES survey	345
2007 PTES survey	298
All surveys	774

TABLE 7

Greater London stag beetle surveys since 1998, number of 1km square records.



MAP 13

London area distribution 1997-2007 mapped at 1km² resolution.

TOP LEFT: Map 14 LWT 1997 survey.

MIDDLE LEFT: Map 15 PTES 1998 survey.

BOTTOM LEFT: Map 16 LWT 1999 survey.

TOP MIDDLE: Map 17 PTES 2002 survey.

MIDDLE MIDDLE: Map 18 LWT 2005 survey.

BOTTOM MIDDLE: Map 19 PTES 2006 survey.

TOP RIGHT: Map 20 PTES 2007 survey.

MIDDLE RIGHT: Map 21 All surveys 1997-2007.

Pratt (2003) commented on the distribution of stag beetles in the London area, publishing a series of maps covering various date classes, including ones for the period 1990 – 2003 and 1999 – 2003. Based on these maps, he concluded that '*after that flight-season (1998), the insect's local range suffered a serious decline, the distribution pattern suddenly contracting to one experienced during the early 1940s*'.

This conclusion is not supported by Maps 13 – 20, where the distribution of stag beetles in Greater London appears to be fairly stable between 1997 and 2007. While the maps presented in Pratt (2003) do appear to show a major change in distribution between 1990-2003 and 1999-2003, this would appear to be an artefact of the data used to produce these two maps. Although the 1990-2003 map includes the data collected during the 1998 national stag beetle survey, neither map includes the data from the 2002 national stag beetle survey. The apparent increase in distribution together with the subsequent decrease in the years from 1999 onwards are purely a reflection of the large number of records collected during the 1998 national stag beetle survey. Were the data from the 2002 national survey to have been included, the picture of the distributions would have been very different.

Across Greater London, while there are some differences in the number of records between the various years, this may well be due in a large part to the amount of recorder effort involved in the surveys. What is clear from these maps is that, even at the small scale of mapping used for Maps 13-20, the areas from where the beetle is recorded remain very much the same from year to year and there is no evidence of any serious decline in stag beetle distribution.

Number & types of record

Adult stag beetles were recorded between April and September in 2006, and between March and October in 2007. The latest record was for 25 of October 2007, when a live male was photographed in Reading in Berkshire. A few stag beetles were reported outside of these dates. These were records of live adults that were dug up while gardening or removing tree stumps. It is considered that these individuals found underground were in fact beetles waiting in their pupal cells to emerge the following summer so have not been included in the analysis of the phenology of the adult beetles. Records of larvae were received throughout the year.

While most records were of single beetles, GSH III did receive some records of large numbers of beetles being seen at one site. These were either mass emergences (e.g. 14 males and 14 females emerging from the ground over three hours) or mass predation events (e.g. 26 males and eight females dead on the lawn due to magpie predation). Overall numbers recorded in 2006 were higher than those in 2007, though this difference is probably due in a large part to the fact that over 1,200 more records were received in 2006 than 2007 due to greater media publicity. The numbers recorded are shown in Table 8.

The overall pattern of sightings for 2006 and 2007 were very similar to those seen in 1988 and 2002 (Figures 1-4). Males began to emerge before the females in late April or early May, reaching a peak of numbers in June when they outnumbered females. After June, their numbers declined. Female numbers also peaked in June, but unlike males their numbers did not decline as rapidly, with more females than males being recorded from July onwards.

Stag beetle activity in 2006 appeared to take place over a narrower time scale than in other seasons. In 2006, 84% of males were seen in June compared with an average of 62% over the other surveys, with female records following a similar pattern. This is most likely due to poor weather experienced in May 2006. The month was very wet and received 177% of the expected rainfall for the month based on the 1961-1990 monthly averages, so it is likely that stag beetle emergence was delayed until the dryer conditions experienced in June.

Each record was categorised depending on its location and what the beetle was observed to be doing. Some records are assigned to multiple categories, particularly where more than one beetle was included on the record. These results are shown in Table 9.

68% of records of beetles in flight refer to male beetles, 22% refer to female beetles. The remaining 10% of records of flying beetles were not sexed by the recorders.

Month	2006		2007	
	Male	Female	Male	Female
Jan	0	0	0	0
Feb	0	0	0	0
Mar	0	0	1	1
Apr	2	0	25	8
May	319	88	508	167
Jun	2,604	1,281	1,215	791
Jul	168	328	281	518
Aug	15	52	13	76
Sep	1	8	1	1
Oct	3	0	1	0
Nov	0	0	0	0
Dec	0	0	0	0
Total	3,112	1,757	2,045	1,562

TABLE 8

Number of adult beetle records by month for 2006 and 2007.

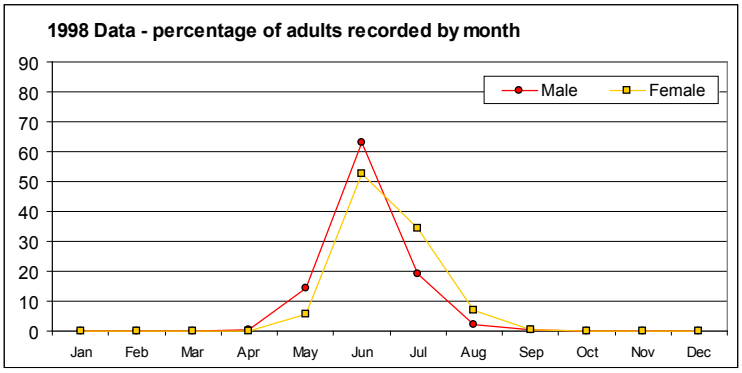
Year	No. of records
Dead on road	117
Killed by predator	187
Dead (reason unknown)	296
Killed by human	79
Drowned/drowning	77
On its back (alive or dead)	137
Attracted to light	24
Fighting	29
Mating	64
Flying	1,926
Feeding	0
Burrowing	26
Beetle underground	33

TABLE 9

Types of record for the 2006 and 2007 surveys.

FIGURE 1

Percentage of beetles recorded by month, 1998 survey.



Human actions once again appear to have a similar level of impact as natural predators, with 196 instances of beetles being found dead on the road or being killed by human action compared with 187 records of beetles being killed by predators.

FIGURE 2

Percentage of beetles recorded by month, 2002 survey.

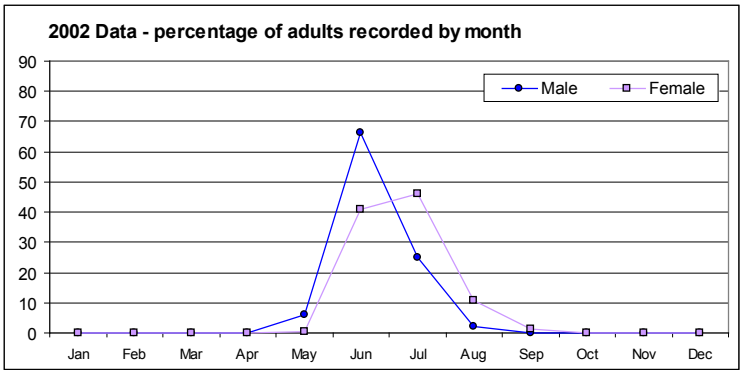


FIGURE 3

Percentage of beetles recorded by month, 2006 survey.

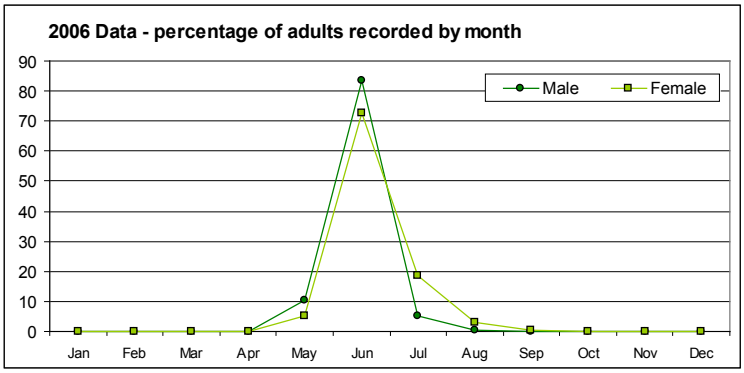
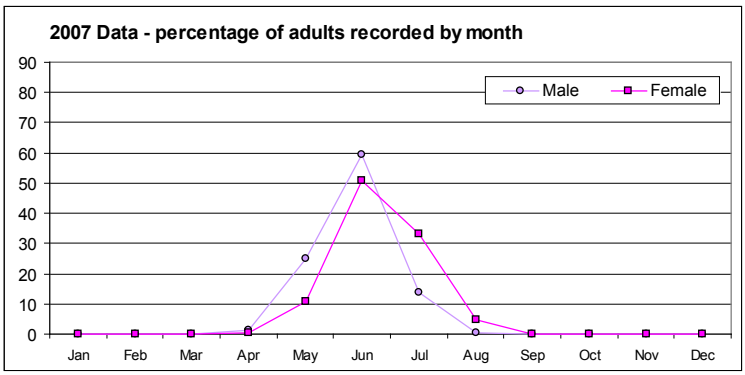


FIGURE 4

Percentage of beetles recorded by month, 2007 survey.



Predators & other hazards

Stag beetles are preyed on by a range of predators. As with previous surveys, the magpie appears to be the most frequent predator of adult beetles (Table 10) and several correspondents reported the predation of large numbers of beetles from around emergence sites. Domestic cats are again the next most reported predator or attempted predator. Foxes and badgers are reported as predators of stag beetle larvae, with records of both species digging up or digging along side stumps where stag beetles are know to be breeding.

Predator	Successful	Unsuccessful
Magpie	38	7
Carrion crow	4	2
Blue tit	-	1
House sparrow	-	1
Blackbird	1	2
Domestic cat	8	16
Domestic dog	-	6
Frog	-	1
Ants	1	-
Spider	-	1
Fox	5	-
Badger	3	-

TABLE 10

Predators and attempted predators recorded during GSH III.

Trees & shrubs

A total of 41 species of trees and shrubs were reported to be associated in some way with stag beetles during the 2006 and 2007 surveys. Some recorders noted a species as a potential oviposition site, in others the beetle was seen using it as a perch or sitting or climbing on the plant or flying in the vicinity. Given that most records come from recorders' gardens, this list is probably more a reflection of the tree and shrub species found in suburban gardens rather than a list of plants that are in some way important to stag beetles. The plant list can be seen in Appendix 1.

As stag beetle larvae spend their life underground, it is sometimes difficult to establish exactly which species of tree or shrub is providing the larval food source. Because of this, many plant species are listed as presumed oviposition sites based on recorder comments such as 'burrowing into lawn over root run of dead cherry tree'. Overall, 70 category 1 records for larvae were received during GSH III. As with previous surveys, it would seem that stag beetles will utilise a range of tree or shrub species as breeding sites.

In addition, stag beetle larvae were recorded from a variety of buried or partly buried wood. These included unidentified tree stumps, wood chip around the base of trees and wood shavings, ornamental oak sleepers, old pressure-treated fence posts and compost heaps. As in previous surveys, larvae were found in soil-filled wooden half barrels being used as ornamental planters. Provided the wood has reached a suitable state of decay it would seem that stag beetles will breed in a range of wood or woody debris, sometimes in quite unusual situations.

Conclusion

Great Stag Hunt III added further to our knowledge of the status and distribution of stag beetles in England and Wales. The survey again found that, in the UK at least, urban and semi-urban habitats are important for stag beetles. The main areas of distribution in south-east England appear little changed over the period 1998-2007, and there are a number of areas where populations appear strong and the beetle has been recorded over all of the four national surveys to date.

Away from the south-east of England, records were again received from Wales and the Severn Valley, together with new records from areas well away from traditional stag beetle localities. Pictures of both males and females from Cheshire suggest that there is indeed a small population present rather than the record being down to a single vagrant individual somehow transported by the actions of man. Overall, the number of hectads from which stag beetles have been recorded increased again, suggesting that picture of a large strong population in parts of the south-east of England, with smaller scattered populations away from the core areas is indeed a true reflection of the distribution of the stag beetle in Britain.

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Appendix 1

TABLE 8

Plant species associated with GSH III stag beetle records.

Species	Common name	Oviposition site
Acer sp.	maple	
Acer pseudoplatanus	sycamore	
Aesculus hippocastanum	horse chestnut	
Betula pendula	silver birch	x
Buddleja davidii	butterfly-bush	x
Corylus avellana	hazel	
Cornus sp.	dogwood	x
Cotinus sp.	smoke bush	
Crataegus monogyna	hawthorn	x
Fagus sylvatica	beech	x
Forsythia sp.	forsythia	
Fraxinus excelsior	ash	x
Gunnera manicata	gunnera	
Hedera helix	ivy	
Hydrangea petiolaris	hydrangea	
Ilex aquifolium	holly	
Juglans regia	walnut	
Cupressocyparis leylandii	leyland cypress	
Ligustrum ovalifolium	garden privet	
Magnolia sp.	magnolia	
Malus domesticus	apple	x
Malus sp	crab apple	
Pinus sp.	pine	
Populus sp.	a poplar	
Prunus domestica ssp. domestica	plum	x
Prunus laurocerasus	cherry laurel	x
Prunus sp	cherry	x
Pyracantha coccinea	firethorn	
Pyrus communis	pear	x
Quercus sp	oak	x
Rosa rugosa	hedging rose	
Rosa sp. cultivar	a cultivated rose	x
Salix sp	willow	
Sambucus nigra	elder	
Sasa sp.	a bamboo	
Sorbus aucuparia	rowan	x
Syringa vulgaris	lilac	x
Taxus baccata	yew	
Tillius europea	lime	
Ulmus sp.	an elm	
Vitis sp.	grape vine	

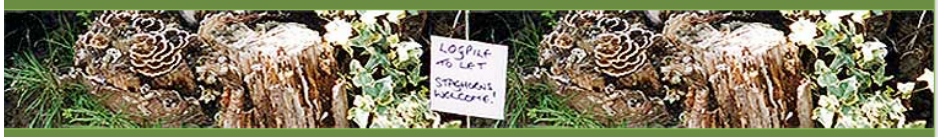
Appendix 2

The Great Stag Hunt III

www.greatstaghunt.org

Appendix 3

The Great Stag Hunt



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- Stag Beetles
- Beetle ID Guide
- Current UK Distribution
- Help stags in your garden
- GSH III Results
- Play the Stag Hunt game
- Photo Competition

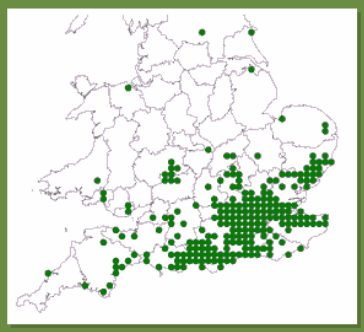
JOIN THE GREAT STAG HUNT!

Help us to preserve this unique species by recording your own sightings of stag beetles.

1054

and counting...

Current UK Distribution



Stag beetles are nowhere near as common as they once were. However they are still relatively widespread in southern England, especially the Thames valley, north Essex, south Hampshire and West Sussex. They are also found in the Severn valley and coastal areas of the southwest. Elsewhere in Britain they are extremely rare or even extinct. Persisting anecdotal evidence suggests that actual numbers are declining in many areas so this latest survey will enable us to build up a long-term picture of how the beetles are faring.

Dead wood is not the only prerequisite for stag beetles. They prefer light soils as females have to dig down to bury their eggs and newly emerging adults have to .nd their way to the surface. Therefore, areas like the North and South Downs, which are chalky, have very few stag beetles. In these areas, they occur only in ribbons along river banks which are often lined with old trees

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The Great Stag Hunt

Historically, the stag beetle has been recorded throughout much of ern Europe, though in many countries it is now thought to be very rare or even extinct. As a consequence, the stag beetle is protected here in the UK.

One of the ways to ensure its survival in this country is to keep a check on whereit is found and try and maintain and increase the number of beetles.

In 1998 we launched the hugely successful Great Stag Hunt and received sightings of stag beetles from thousands of volunteers across England. We followed this up with Great Stag Hunt II in 2002 to check that their numbers had not reduced further.

More than 8,000 people joined in the hunts and reported over 14,000 stag beetle sightings. As a result, we have been able to draw an accurate map of where they are and learn a lot more about them.

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The People's Trust for Endangered Species is creating a future for vulnerable species and habitats worldwide. We tackle threats to wildlife by putting people at the heart of the solution and focusing effort where it will have the most far reaching and enduring effect.

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