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National Stag Beetle Survey 2002

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Male stag beetle and larva

Summary

PTES is the Lead Partner of the Stag Beetle Species Action Plan (SAP) and organised the first national survey of the beetle in 1998. This was very successful and resulted in the production of up-to-date distribution maps for the stag beetle in the UK. This later survey was organised to gather further information on the distribution of the species during 2002, when it was hoped that many of the offspring of the beetles recorded in 1998 would emerge.

In 2002, a total of 3033 records were received from 1359 recorders. Although fewer records were received in 2002 than in 1998, the proportion of records received from each county was very similar to that seen during the 1998 survey. Category 1 records are those considered to be definite records for the stag beetle and Category 2 records are those where there was some question as to whether the record actually referred to the stag beetle or not. Overall, 2830 records were classed as Category 1 and 95 placed in Category 2. In addition, 108 recorders sent in 'nil' records i.e. information on localities where they had not recorded any stag beetles.

75% of the 2002 Category 1 stag beetle records came from private gardens, with a further 22% from associated areas such as pavements, roads, town centres and local parks. Gardens, particularly in south-east England, do appear to be an important habitat for a large proportion of the stag beetle population in Britain. Particular 'hotspots' can be found in and around Bournemouth, South and South-east London.

This survey recorded stag beetles from a total of 150 hectads (10km grid squares). The mapped distribution agrees well with that seen in the 1998 survey. The majority of stag beetle records came from south-east England with a scattering of records north to Yorkshire. The Thames Valley, South-east London, Dorset, Hampshire and Suffolk continue to produce good numbers of records.

The small population around the Gloucester/Worcestershire border is still present and stag beetles were re-recorded from Cardiff in Wales. Encouragingly, during 2002, records

were also received from Yorkshire, Lincolnshire, Warwickshire, Cambridgeshire and Norfolk, counties where the beetle was not seen in 1998.

Information from the recorders indicates that a range of animals are stag beetle predators. Magpies were the most frequently mentioned predator. The actions of humans appear to have as great an impact on adult stag beetles as do natural predators.

Although the results of the 2002 survey suggest that the current distribution of the stag beetle has changed little since the 1998 survey, further surveys will be required in future to establish any long term trends in the distribution of the species. [n](#)

Male stag beetle



Introduction

THE STAG beetle *Lucanus cervus* is Britain's largest terrestrial beetle. Adult male beetles are easily recognised by their prominent 'antlers', actually greatly enlarged mandibles. Female beetles burrow down beneath the surface of the ground to lay their eggs and the larvae feed on rotten wood. Larvae take at least three years to develop before building a large, underground pupal cell. Adult beetles emerge from the pupae in late summer and remain underground before digging their way to the surface the following summer.

Historically, the stag beetle has been recorded from much of western Europe, though in many countries it is now thought to be very rare or even extinct. As a consequence, the stag beetle is listed on Schedule II of the EC Habitats Directive. In the UK, the stag beetle is classed as Nationally Scarce (Hyman & Parsons 1992) and the UK Biodiversity Group produced a stag beetle Species Action Plan (SAP) in 1995. The species was listed on Schedule 5 of the Wildlife & Countryside Act in 1998, making it illegal to trade in the species without an appropriate licence.

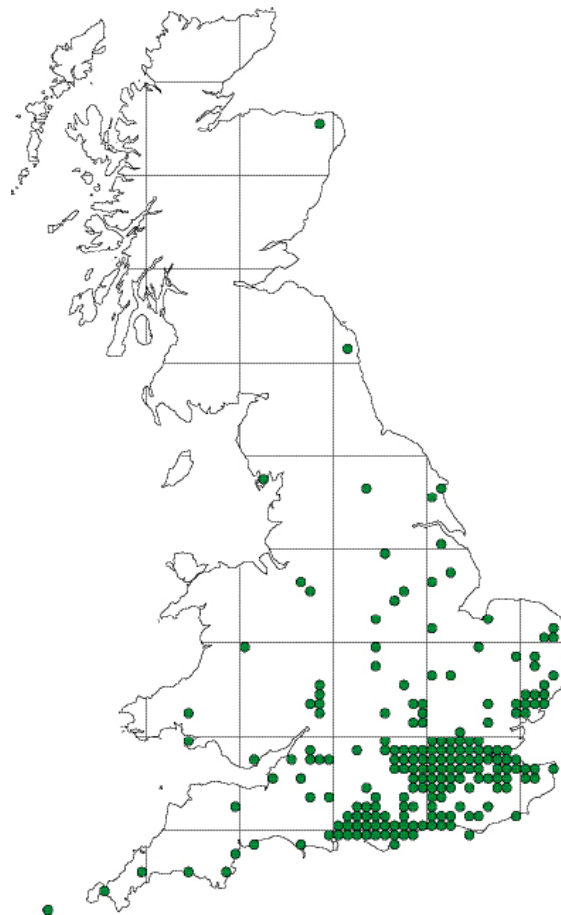
In 1998 PTES became the Lead Partner of the stag beetle SAP and organised the first national survey of the beetle (Percy et al. 1999). This was very successful and resulted in the production of up-to-date distribution maps for the stag beetle in the UK. This later survey was organised to gather further information on the distribution of the species during 2002, when it was hoped that many of the offspring of the beetles recorded in 1998 would emerge. Recording forms were sent to people on request.

Method

A total of 3033 records from 1359 recorders were received (Map 1). The great majority of these arrived on 'Great Stag Hunt II' recording forms produced by PTES, with just over 10% of respondents sending in records via the PTES website. A few records were collated from other sources such as County Coleoptera recorders, newspaper reports or Local BAP recording efforts such as one run by Bracknell

Forest Borough Council which recorded 30 sightings of the beetle.

Each record was 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 question as to whether the record actually referred to the stag beetle or not. Factors taken into consideration included the size of the beetle, colour, behaviour and location. Larval records proved the most problematical, because young stag beetle larvae are very similar in size and appearance to the larvae of other beetle species such as the cockchafer *Melolontha melolontha*. A number of records were submitted with photographs of the insect in question. These proved very useful, particularly when trying to distinguish between records of small female stag beetles and large lesser stag beetle, *Dorcus parallelipipedus*. In some instances,



MAP 1

2002
SAG BEETLE SURVEY,
records received
by 10km²,
all categories

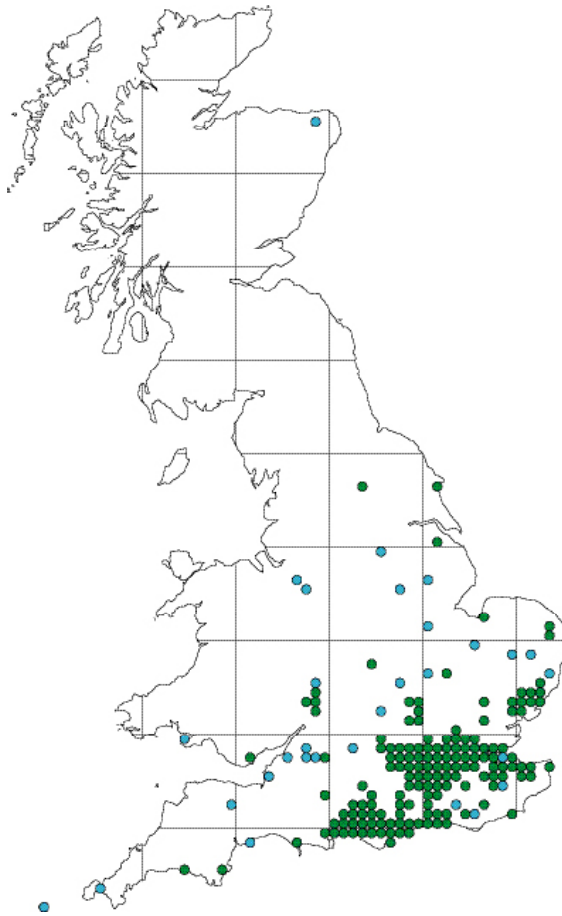
MAP 2

2002 STAG BEETLE SURVEY

Category 1 & 2 records received by 10km²

KEY:

- Category 1 records
- Category 2 records



follow-up calls were made to recorders to obtain more information on particular sightings, particularly those away from the main area of distribution. Overall, 2830 records were classed as Category 1 and 95 as Category 2 (see Map 2).

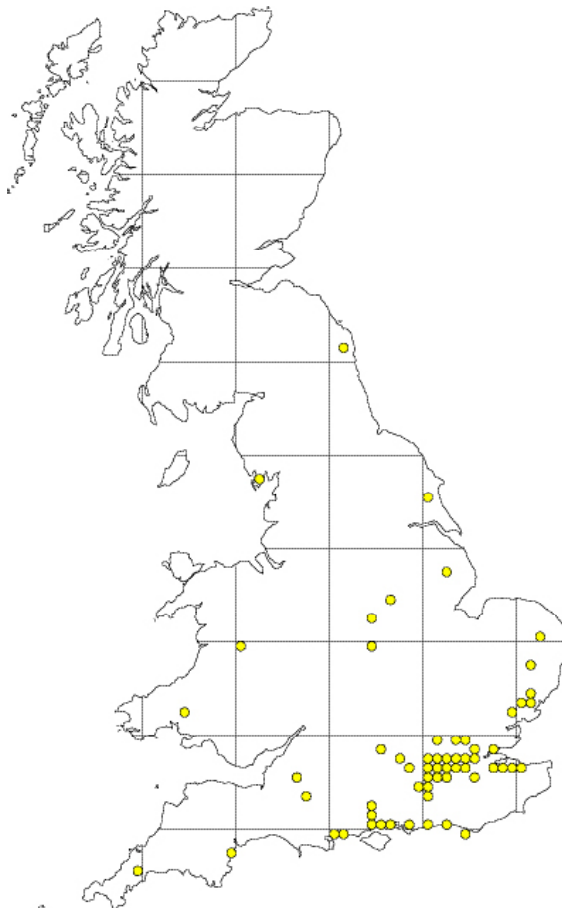
In addition to the stag beetle records, 108 recorders sent in 'Nil' records, i.e. information regarding localities where they had not recorded any stag beetles. Records of this type are very useful when compiling distribution maps. In order to avoid confusion with Category 1 and 2 records, these were entered into the database as records for 'Coleoptera sp.' (Map 3).

All records resulting from the 2002 survey, together with a few additional records for 2000 and 2001 submitted to PTES following publicity of earlier reports, were input into a 'Recorder 3.3' database. Where not supplied by the recorder, a grid reference for the record was obtained using a combination of Ordnance Survey maps, the Gazetteer of Great Britain (Ordnance Survey 1999) and the internet (www.streetmap.co.uk).

MAP 3

2002 STAG BEETLE SURVEY

'Nil' records received by 10km²



Recorder is a software package designed by the Joint Committee for Nature Conservation (JNCC) for site/species recording. Although very good for the rapid input of data, the reporting functions of Recorder are somewhat dated. In order to overcome this, a copy of all of the survey data was exported to a flat file database developed using Lotus Approach. This is a widely used package that holds data in a dBASE IV (.dbf) file format. As such the reporting functions are much improved and data from the survey can be made available in a range of electronic file formats. Distribution maps were produced using DMAP mapping software. n

Results of the survey

THE 2002 survey collected 2830 Category 1 records for the stag beetle, compared to 9381 in 1998. Numbers of records are much reduced.

While this may suggest a large decline in the stag beetle population in Britain, it would appear that the reduced number of 2002 records can be attributed, at least in part, to difficulties in informing potential recorders that the survey was taking place, particularly those who had not participated in the 1998 survey. Uptake of press releases and the

publication of articles in local newspapers was much slower than in 1998 and a number of recorders commented that they only became aware that a survey was in progress well after stag beetles had first emerged.

Although fewer records were received in 2002, the proportion of records received from each county was very similar to that seen during the 1998 survey (Table 1). This suggests that the lower number of records is not due to a lack of records or recorders from any one particular county. Some differences were apparent,

COUNTY	2002		1998	
	Number of records	% of total	Number of records	% of total
Avon	-	-	4	0.04
Bedfordshire	1	0.04	1	0.01
Berkshire	228	8.06	662	7.06
Buckinghamshire	51	1.80	193	2.06
Cambridgeshire	1	0.04	-	-
Clwyd	-	-	1	0.01
Cornwall	-	-	1	0.01
Devon	2	0.07	12	0.13
Dorset	193	6.82	636	6.78
Dyfed	-	-	1	0.01
East Sussex	14	0.49	8	0.09
Essex	131	4.63	538	5.73
Gloucestershire	1	0.04	3	0.03
Hampshire	338	11.94	950	10.13
Hereford & Worcester	10	0.35	17	0.18
Hertfordshire	7	0.25	62	0.66
Kent	271	9.58	464	4.95
Greater London	817	28.87	2936	31.30
Lincolnshire	1	0.04	-	-
Norfolk	5	0.18	-	-
Oxfordshire	36	1.27	176	1.88
Somerset	-	-	4	0.04
South Glamorgan	2	0.07	2	0.02
Suffolk	124	4.38	857	9.14
Surrey	356	12.58	1295	13.80
West Glamorgan	-	-	2	0.02
Warwickshire	1	0.04	-	-
West Sussex	231	8.16	547	5.83
Wiltshire	6	0.21	9	0.10
Yorkshire	3	0.11	-	-
TOTAL	2830	100	9381	100

TABLE 1
2002 STAG BEETLE SURVEY

Number of Category 1 stag beetle records received from each county

NOTE:
1) Records for Hampshire include those from the Isle of Wight.
2) The 1998 record from Norfolk was found to be in error due to an incorrectly entered grid reference. This record is now included in the 1998 total for Suffolk.

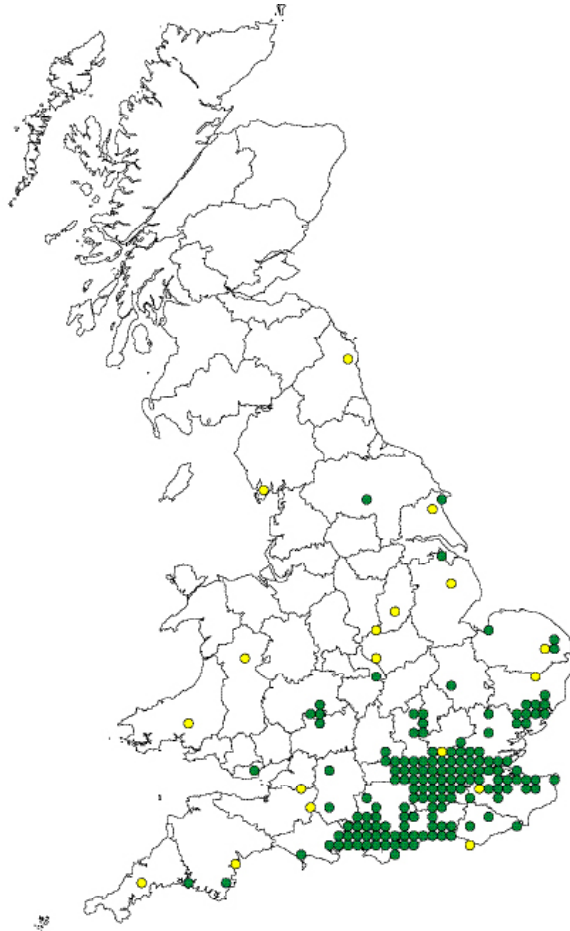
MAP 4

2002 STAG BEETLE SURVEY

Category 1 and Nil records received by 10km²

KEY:

- Category 1 records
- Nil records



Suffolk seemed to have had a 'poor' year, producing 4.38% of the Category 1 records in 2002 compared to 9.14% in 1998, while West Sussex had a 'good' year, contributing 8.16% of the 2002 Category 1 records compared to 5.83% in 1998. It would be unwise to draw any conclusions of increases or declines in stag beetle populations from these two sets of figures. Further surveys will be required before any trends in population can be established.

Distribution

The 2002 survey recorded stag beetles from 150 hectads (Map 4). The overall distribution accords well with that seen in 1998. The majority of stag beetle records come from South-east England with a scattering of records north to Yorkshire. The Thames Valley, South-east London, Dorset, Hampshire and Suffolk continue to produce good numbers of records. The population around the Gloucester/Worcestershire border still survives and the species was re-recorded from Cardiff in Wales. Encouragingly, records were also received from Yorkshire, Lincolnshire, Warwickshire, Cambridgeshire and Norfolk, counties where the beetle was not seen in 1998.

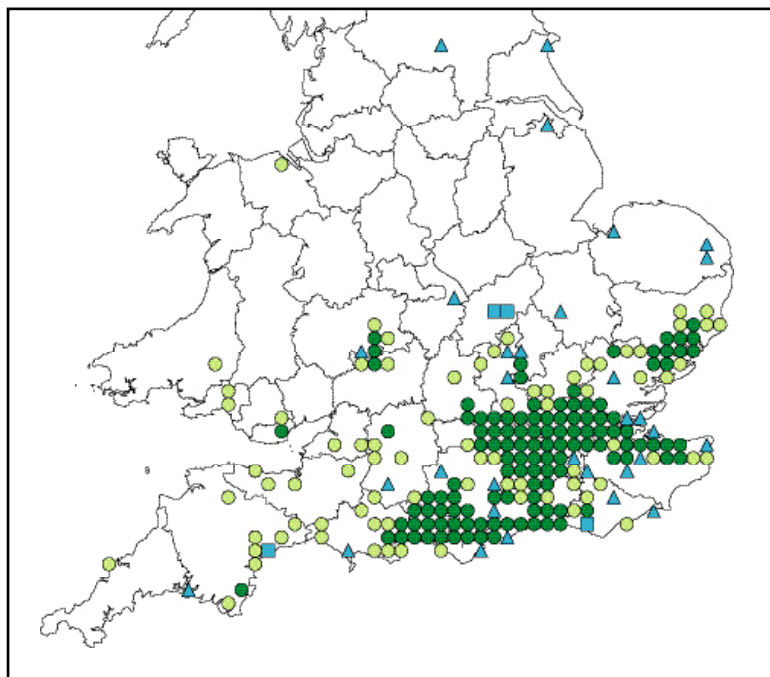
In total, the 1998 and 2002 surveys have recorded stag beetles from 229 hectads. Stag beetles were recorded during both surveys from 119 hectads. '1998 only' records came from 79 hectads, '2002 only' records from 31 hectads. As is to be expected, many of the hectads where the species has only been recorded during one survey are in areas around the margins of the main blocks of distribution in South-east England, with the remainder having a patchy distribution in England and Wales (Map 5). 74% of these

MAP 5

STAG BEETLE DISTRIBUTION 1998 - 2002, records by 10km²

KEY:

- 1998 & 2002 survey records
- 1998 records only
- ▲ 2002 records only
- New hectad records 1999-2001

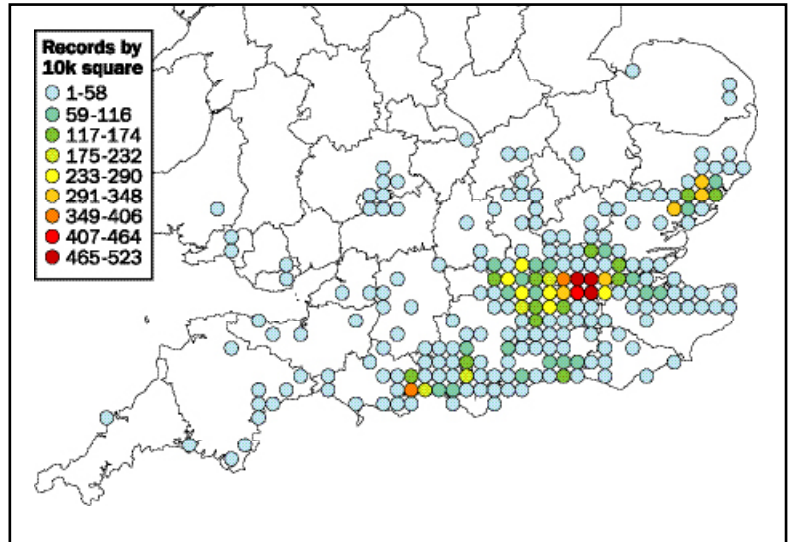


records would appear to be the first or only record of the species from that hectad, suggesting that only small populations are present in these areas.

In addition to the survey data, additional records for 1999, 2000 and 2001 collated by PTES show the stag beetle to have been recorded from a total of 233 hectads in England and Wales since 1998. These include two records of the beetle from Northamptonshire in 2001 (Drane 2001), a county where the species was not recorded during either the 1998 or 2002 surveys.

Historically, the stag beetle has been regarded as a specialist woodland species (e.g. 'the stag beetle primarily inhabits oakwoods' - Harde 1998).

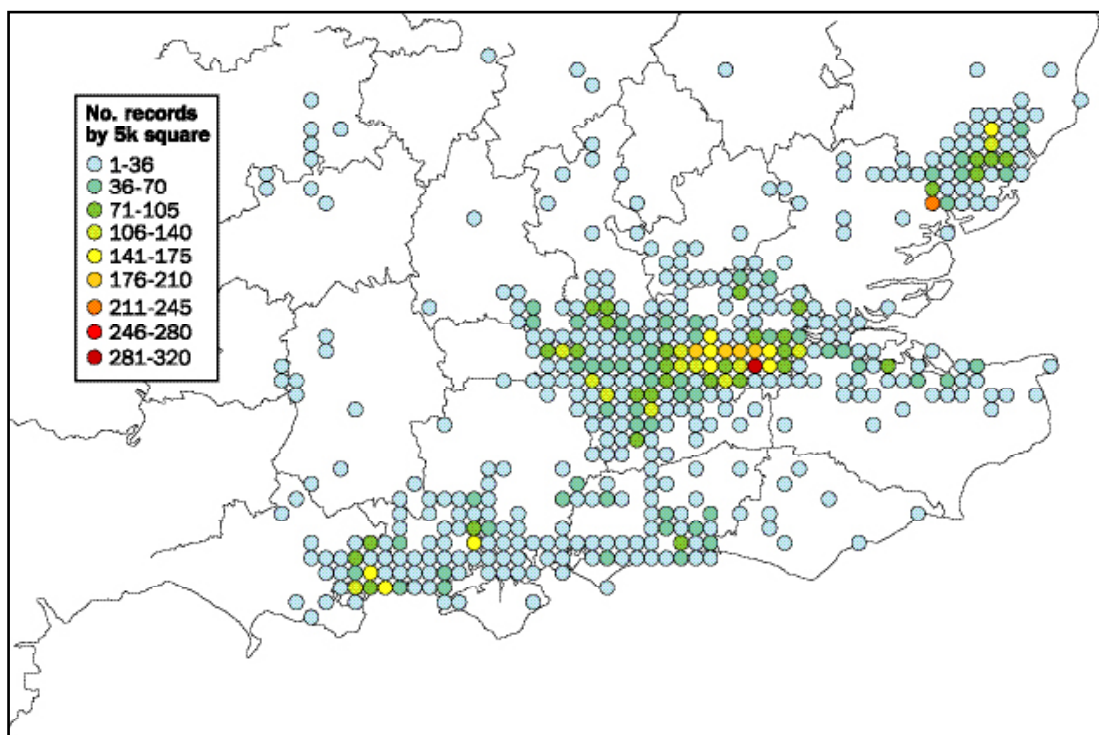
While this may be true in parts of Europe, in Britain at least this appears not to be the case. Hyman and Parsons (1992) cite the British habitat as 'broad-leaved woodlands, pasture woodlands and gardens'. As in 1998, the results of the 2002 survey would appear to bear this out. 75% of the 2002 Category 1 stag beetle records came from private gardens, with a further 22% from associated areas such as pavements, roads, town centres and local



MAP 6

STAG BEETLE RECORDS 1998-2002
No. of records by 10km²

parcs. While there is obviously some element of recorder bias within these figures (i.e. there are more potential recorders for a given area of town or village than in open fields), gardens, particularly in South-east England, do appear to be an important habitat for a large proportion of the stag beetle population in Britain. Particular 'hotspots' can be found in and around Bournemouth, South and South-east London and Ipswich. There is often some



MAP 7

STAG BEETLE RECORDS 1998-2002
No. of records by 5km²

debate as to whether stag beetles recorded away from their main (or expected) areas of occurrence 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 (e.g. Pratt 2000, Drane 2001, Lane et al. 2002). Certainly, the stag beetle can on occasion be transported some distance by unwitting human intervention. One 2002 survey form from Chichester noted 'In 2001, one male must have flown in through the window into a suitcase on the bed and travelled to Somerset where our guest opened her case and removed it (horrified) into her garden'. However, it seems unlikely that all records away from South-east England are the result of such instances.

Although their life cycle may take several years, adult stag beetles are normally only observable for a few weeks at the end of this period. The length of the larval stage means that there may be several years between sightings of adult beetles, particularly if the population at the site is small. Stag beetle larvae develop underground in wood that has

reached an appropriate state of decay. It may take a number of years for a dead root or stump to decay sufficiently so that it is acceptable as an oviposition site. Potential larval development sites will therefore occur in small, discrete patches scattered throughout an area. One large stump or root system may provide food for several generations of beetle, with the short-lived adults only dispersing to new sites when much of the wood has been consumed. As a result, populations or breeding sites can be very localised and stag beetles difficult to find. Evidence of this can be seen in Map 8, which shows 2002 Category 1 and Nil records in the Greater London area, mapped at the 1km square level. Even in areas with good numbers of stag beetle records there are 28 1km² from which both stag beetle and 'Nil' records were submitted.

Given all of the above, it would seem probable that many of the records for 'accidental' or 'vagrant' beetles from central and northern England are, in fact, evidence of small, localised populations of the stag beetle. In Europe, stag beetles are recorded at least as far north as they are in Britain, and from areas with much more severe winters (Percy et al. 2000), though being temperature-dependent,

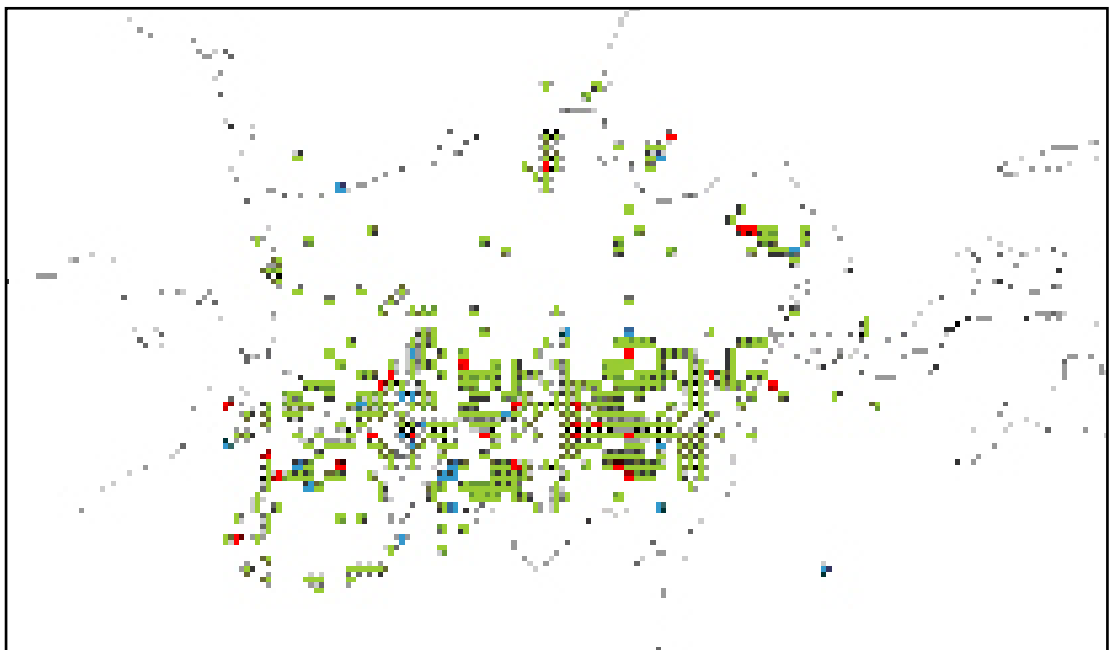
MAP 8

2002 STAG BEETLE SURVEY

Greater London area Category 1 and nil records received by 1km² square

KEY:

- Stag beetle recorded
- Nil records
- 1km² squares with both stag beetle and Nil records



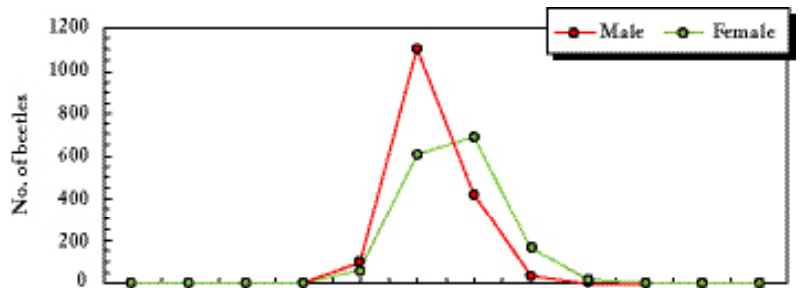
larval development may take longer. Adult activity is also dependent on temperature. As with other insects, there will be a threshold temperature below which stag beetles will not fly, though what this is is not currently known. Adult beetles are most often reported in flight on warm, still evenings in June and July. Provided that these more northerly English populations experience days during the period of adult emergence when temperatures exceed this threshold temperature, mating and dispersal flights should be possible and these small, localised populations should persist. Further survey and research into these aspects of stag beetle biology and distribution are needed.

Numbers Recorded

Adult stag beetles were recorded between February and September 2002, with the last live sighting occurring on 9 September. The February record of a flying male is exceptionally early. Similar reports from previous years have been the result of disturbance of the beetles' overwintering sites.

The pattern of sightings of male beetles varied little between 1998 and 2002. Males began emerging in May and numbers peaked in June. With female beetles, a different pattern of emergence was seen in 2002 from that noted in 1998. In 1998, the pattern of emergence of females was similar to that seen with the males, with females emerging in May and numbers peaking in June. In 2002, female emergence again started in May but numbers observed reached their maximum in July. There was also much less of a pronounced peak of emergence, the percentage of beetles seen in June (40%) being very similar to that seen in July (44%). Possibly the poor weather experienced during the early part of the summer in 2002 may have been responsible for the delay in the emergence of a proportion of the adult females.

A number of recorders commented that numbers of beetle were up, down or similar when compared with sightings in previous years. Comments ranged from both extremes, from 'the best year here for at least last 5 years,'



MONTH	Male	Female
Jan	0	0
Feb	1	0
Mar	3	1
Apr	3	3
May	98	60
Jun	1098	607
Jul	415	682
Aug	35	162
Sep	2	18
Oct	1	0
Nov	0	0
Dec	0	0

FIGURE 1
2002 STAG BEETLE SURVEY
Number of adult records by month

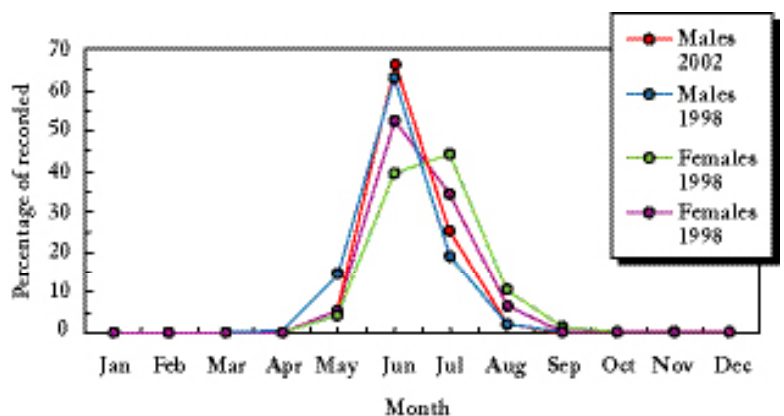


FIGURE 2
Percentage of beetles recorded by month, 1998 and 2002 surveys.

TABLE 2**2002 STAG BEETLE SURVEY**

Types of record
90% of records of flying beetles refer to males

CATEGORY	Number of records
Dead on road	83
Killed by predator	80
Dead (reason unknown)	155
Killed by human	41
Drowned/drowning	63
On its back (alive or dead)	74
Attracted to light	29
Fighting	8
Mating	18
Flying	600
Feeding	2
Burrowing	17
Beetle underground	26

through 'population seems steady, seen for over 25 years here' to 'the fewest sightings for 15 years'. Thirteen recorders thought that numbers were up, ten that numbers were the same and 75 that numbers had fallen. Without long term monitoring of populations it is impossible to say whether overall populations are increasing or declining or whether these comments refer to more local fluctuations in beetle numbers.

Type of Record

Each record was categorised depending on what the beetle was observed to be doing. Some records were assigned to multiple categories, particularly those where more than one beetle was observed on a given date. The results are summarised in Table 2.

Adult Feeding

Only two records of adult beetles feeding were received. One female was seen feeding on a fallen pear and a male was noted 'clutching a very ripe Cherry-plum'.

Fighting and Mating

Pairs of stag beetles were noted mating on 18 occasions. As previously, a few records indicated that male beetles appear to be attracted to recently dead squashed females,

suggesting that females produce an attractant pheromone. Eight records of male beetles fighting were received. On one occasion when two males and one female were seen, the recorder noted the 'the winner of the battle mated with female'.

Predators and other hazards

Despite their large size, stag beetles are preyed on by a range of predators. As a group, Corvids appear to be the most frequent predators, with magpies taking the most beetles. Several correspondents reported magpies waiting in the vicinity of known stag beetle colonies and attacking the beetles as they emerged from the soil. Domestic cats are the next most frequent predator or attempted predator. Ants are mentioned as occasional predators. It would appear unlikely that ants would actually cause the death of adult beetles. These reports are probably of ants scavenging on the remains of beetles that were already dead. These results, though fewer in number, are similar to those reported in 1998.

The actions of humans appear to have as great an impact on adult stag beetles as do predators, a situation that again agrees with the results of the 1998 survey. There were 83 records of beetles found dead on roads and a further 41 were recorded as being killed by human action. Some appear to have been killed deliberately and others accidentally by operations such as grass cutting. Jones (2002) suggests that grass cutting operations in South London parks may be an important cause of mortality in these areas.

Sixty-three records of drowned or drowning beetles were received in 2002. Most of these were from ponds or water-filled items in gardens. A single water hazard can cause the death of many beetles. One correspondent noted 25 males and 3 females drowned at a single site. On a more encouraging note, several recorders commented how surprised they were that apparently moribund beetles found in ponds or water butts recovered if removed from the water and left for approximately 24 hours.



Female stag beetle

Tree and Shrubs

A total of 50 species of trees and shrubs were reported to be associated in some way with stag beetles in 2002. Some records note the species as a potential oviposition site. In others the beetle was seen sitting or climbing on the plant or flying in the vicinity. Given that most records came from recorders' gardens, this list is probably more a reflection of the tree and shrub species found in suburban gardens than a list of plants that are all in some way important to the stag beetle. The plant list can be seen in the appendices.

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, 50 Category 1 records for larvae and four records of pupae were received in 2002.

As in 1998, it would seem that stag beetles will utilise a range of tree or shrub species as breeding sites. Twenty-seven plant species were mentioned as suspected or confirmed oviposition sites.

These included honeysuckle, cherry-plum, greengage and rhododendron, species not noted as such in the 1998 survey.

In addition, stag beetle larvae were recorded

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Appendix

APPENDIX 1

Tree and shrub species mentioned in association with stag beetles 2002

SPECIES	COMMON NAME	1998 RECORD
<i>Acer pseudoplatanus</i>	Sycamore	Yes
<i>Aesculus hippocastanum</i>	Horse-chestnut	Yes
<i>Betula pendula</i>	Silver Birch	Yes
<i>Buddleja davidii</i>	Butterfly-bush	Yes
<i>Cedrus libani</i>	Cedar of Lebanon	
<i>Clematis</i> (cultivar)	Clematis	Yes
<i>Corylus avellana</i>	Hazel	Yes
<i>Cotoneaster</i> sp.	a cotoneaster	Yes
<i>Crataegus monogyna</i>	Hawthorn	Yes
<i>Eucalyptus gunnii</i>	Cider Gum	
<i>Filipendula ulmaria</i>	Meadowsweet	
<i>Fraxinus excelsior</i>	Ash	Yes
<i>Hebe</i> (cultivar)	Veronica	
<i>Hedera helix</i>	Ivy	Yes
<i>Ilex aquifolium</i>	Holly	Yes
<i>Jasminum officinale</i>	Summer Jasmine	Yes
<i>Juglans regia</i>	Walnut	Yes
<i>Laburnum anagyroides</i>	Laburnum	Yes
<i>Laurus nobilis</i>	Bay	Yes
<i>Ligustrum ovalifolium</i>	Garden Privet	Yes
<i>Lonicera periclymenum</i>	Honeysuckle	Yes
<i>Malus domestica</i>	Apple	Yes
<i>Malus sylvestris</i>	Crab Apple	Yes
<i>Parthenocissus quinquefolia</i>	Virginia-creeper	Yes
<i>Philadelphus coronarius</i>	Mock Orange	Yes
<i>Populus</i> sp.	a poplar	Yes
<i>Prunus avium</i>	Wild Cherry	Yes
<i>Prunus cerasifera</i> var. <i>pissardii</i>	a cherry plum	
<i>Prunus domestica</i> ssp. <i>domestica</i>	Cultivated Plum	Yes
<i>Prunus domestica</i> ssp. <i>insititia</i>	Damson	Yes
<i>Prunus domestica</i> ssp. <i>italica</i>	Greengage	
<i>Prunus laurocerasus</i>	Cherry Laurel	Yes
<i>Prunus persica</i>	Peach	Yes
<i>Prunus</i> sp.	Ornamental Cherry	Yes
<i>Pyracantha coccinea</i>	Firethorn	Yes
<i>Pyrus communis</i>	Cultivated Pear	Yes
<i>Quercus cerris</i>	Turkey Oak	
<i>Quercus ilex</i>	Evergreen Oak	Yes
<i>Quercus</i> sp.	an oak	Yes
<i>Rhododendron</i> sp.	A Rhododendron	Yes
<i>Rosa</i> sp. cultivar	a cultivated rose	Yes
<i>Salix</i> sp.	a Willow	Yes
<i>Sambucus nigra</i>	Elder	Yes
<i>Sorbus aucuparia</i>	Rowan	Yes
<i>Spiraea japonica</i>	Japanese Spiraea	
<i>Syringa vulgaris</i>	Lilac	Yes
<i>Taxus baccata</i>	Yew	Yes
<i>Tilia</i> sp.	a lime	Yes
<i>Ulmus</i> sp.	an elm	Yes
<i>Viburnum</i> (cultivar)	a viburnum	Yes

APPENDIX 2

Plant species as a confirmed or suspected oviposition site

TREE SPECIES	COMMON NAME	TOTAL OF RECORDS FOR THIS SPECIES	NO. RECORDS OF LARVAE	NO. OF RECORDS OF SPECIES AS OVIPOSITION SITE	1998 SURVEY RECORD FOR THIS SPECIES
<i>Acer pseudoplatanus</i>	Sycamore	1	-	1	Yes
<i>Aesculus hippocastanum</i>	Horse-chestnut	2	-	2	Yes
<i>Betula pendula</i>	Silver Birch	3	-	3	Yes
<i>Buddleja davidii</i>	Butterfly-bush	2	-	2	Yes
<i>Corylus avellana</i>	Hazel	1	1	-	Yes
<i>Crataegus monogyna</i>	Hawthorn	3	2	1	Yes
<i>Fagus sylvatica</i>	Beech	3	1	2	Yes
<i>Fraxinus excelsior</i>	Ash	4	1	3	Yes
<i>Juglans regia</i>	Walnut	2	1	1	Yes
<i>Laburnum anagyroides</i>	Laburnum	2	-	2	Yes
<i>Lonicera periclymenum</i>	Honeysuckle	1	1	-	-
<i>Malus domestica</i>	Apple	15	4	11	Yes
<i>Populus</i> sp.	a poplar	1	-	1	Yes
<i>Prunus avium</i>	Wild Cherry	1	1	-	Yes
<i>Prunus cerasifera</i> var. <i>pissardii</i>	a cherry plum	1	-	1	-
<i>Prunus domestica</i> ssp. <i>domestica</i>	Plum	3	3	1	2 Yes
<i>Prunus domestica</i> ssp. <i>italica</i>	Greengage	1	1	-	-
<i>Prunus</i> sp.	Ornamental Cherry	4	-	4	Yes
<i>Pyrus communis</i>	Pear	2	1	1	Yes
<i>Quercus ilex</i>	Evergreen Oak	1	1	-	Yes
<i>Quercus</i> sp.	an oak	4	-	4	Yes
<i>Rhododendron</i> sp.	A Rhododendron	1	1	-	-
<i>Salix</i> sp.	a Willow	2	-	2	Yes
<i>Sorbus aucuparia</i>	Rowan	1	-	1	Yes
<i>Syringa vulgaris</i>	Lilac	5	3	2	Yes
<i>Tilia</i> sp.	a lime	1	-	1	Yes
<i>Ulmus</i> sp.	an elm	1	1	-	Yes

APPENDIX 3

Animal species noted in association with stag beetles

SPECIES	COMMON NAME	NO. OF RECORDS	SUCCESSFUL PREDATOR (S) UNSUCCESSFUL PREDATOR (U) POSSIBLE PREDATOR (P) DEFENCE RESPONSE TO (D)
<i>Accipiter nisus</i>	Sparrowhawk	1	U
<i>Canis familiaris</i>	Domestic Dog	2	U (1), P (1)
<i>Corvus corone</i> agg.	Carrion Crow	4	S (3), U (1)
<i>Corvus monedula</i>	Jackdaw	1	S
<i>Felis domesticus</i>	Domestic cat	14	S (2), U (5), P (7)
<i>Garrulus glandarius</i>	Jay	1	S
<i>Homo sapiens</i>	Man	1	S (1), D (9)
<i>Lasius niger</i>	Small Black Ant	3	S (1), P (3)
<i>Passer domesticus</i>	House Sparrow	1	S (3), U (1)
<i>Pica pica</i>	Magpie	22	S (18), P (4)
<i>Vulpes vulpes</i>	Fox	5	S (5)
-	Unknown Predator	28	-