

The UK Glow Worm Survey

The UK Glow Worm Survey and the distribution of glow worms in the UK

[Robin Scagell](#)

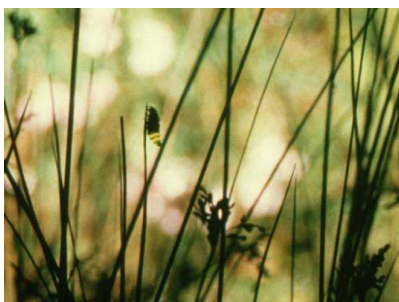
Abstract

This privately organised survey began in 1990 as it seemed that it was difficult to get information about places where the common glow worm, *Lampyrus noctiluca*, could be seen. Appeals on radio and in magazines produced a good response from members of the public in the UK, and many new locations have been discovered. The paper briefly describes the life cycle and habitats of *L. noctiluca*, and describes how the survey is carried out, which these days is mostly through a website. Problems with storing and analysing the data are mentioned, and some reasons for the apparent decline in numbers of glow worms in the UK are discussed.

First I should introduce myself. My background is not in any aspect of zoology, animal behaviour or natural history, but in physics and astronomy, so if I say anything stupid please forgive me.

I first saw fireflies in the 80s on a holiday in Germany, when I saw a swarm of them in a park overlooking the town of Offenbach one evening. My German companion had never seen them before either, and I became interested to learn if they could be seen in England as well. People in the UK have heard of fireflies and glow worms, but they are not well-known, and I think most people, like me at the time, think they are probably only to be seen abroad.

The Natural History Museum told me that we only get glow worms, *Lampyrus noctiluca*, in the UK, but were not sure whether the flying males could be seen as fireflies. They gave me an old list of sites, and eventually I found my first glow worm on the coast of Devon, a couple of hundred miles from where I live. To cut a long story short, after a few years I discovered that glow worms are much more common than I realised, and discovered quite a large colony of them, previously unknown, just a couple of miles from where I lived, on the outskirts of London.



I decided that the information publicly available was considerably out of date at the time, knowing little about the systems for recording wildlife which were then already in place, and started asking people to send me information about glow worms they had seen. My interest in this was very much stimulated by my interest in astronomy, and of course there is a strong overlap where light pollution

is concerned. I felt that by keeping a record of sites around the country from year to year, it might be possible to decide whether increased light pollution has any effect on the glow worm population.



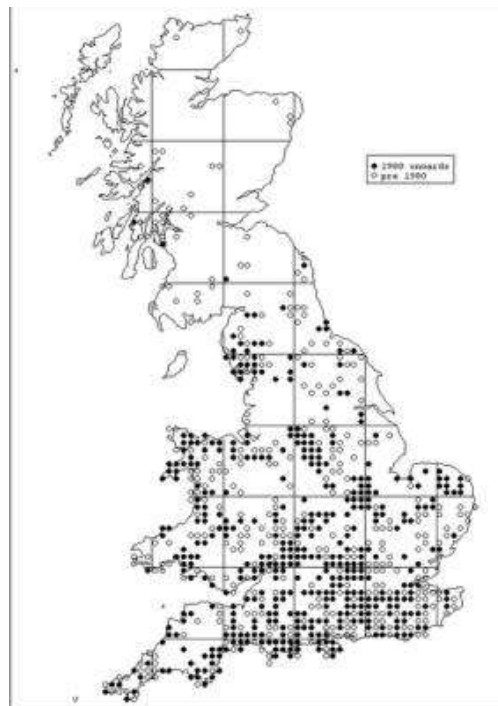
L. noctiluca

I should say something briefly about the common European glow worm, *Lampyrus noctiluca*. The larvae hatch out in the summer, feed on slugs and snails, and usually pupate in their second year, though whether this is always the case I am not sure -- some may go on to three years. The females are flightless and are the ones that glow, while the males fly but have no significant ability to glow, so you don't see them glowing as they fly, or at least I have never heard of this. I've only ever seen one male glow, and then only faintly and briefly and in captivity.

Left: A female glow worm clinging to a grass stem. Credit Robin Scagell. Right: A time exposure shows that she moves her abdomen to improve visibility of the glow. Credit John Tyler

The colony size is usually quite small. Typically people report them in single figures on any particular evening -- they may say that they always have one or two glow worms in their garden in summer. They are most likely but not exclusively to be found on unimproved grassland, and though it is said that they prefer calcareous soils such as chalk, this may be because there is a lot of unimproved grassland on chalk hills. On large sites, such as what we call downland, which is chalk hill terrain, you can find them dotted all over the area for as long as the terrain remains the same, though there are apparently inexplicable changes in location over the years. Of course there is no such thing as an unchanging habitat, and there may be variations in management which are not obvious at first, such as rabbit control, which have an effect. Rarely do you see many close together, though on exceptional occasions you can see a dozen or more in a small area.

The 'official' map of the distribution of glow worms in the UK is issued by the BRC, which gives dots in 10 km squares. These are filled dots for reports since 1980, or open dots for reports prior to 1980. It shows that glow worms are widely distributed, with greater numbers to the south of the country. There is a small correlation with geology, notably calcareous soils.

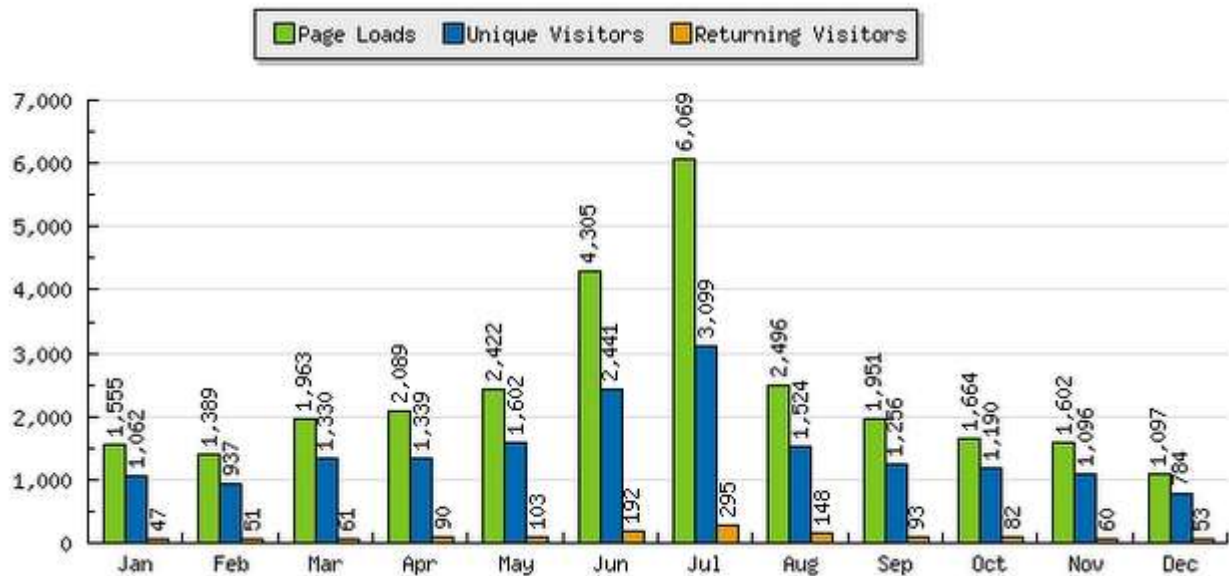


The Survey

I think it is worth talking about my approach to the survey, as it may help and encourage others. Originally I put a letter in New Scientist magazine, and got a few encouraging replies. In 1991 and 1992 I got more widespread publicity on radio programmes and in BBC Wildlife Magazine, and I received literally hundreds of replies from all over the UK. Some of these people reported back to me year after year, and I received occasional boosts of publicity in magazine and newspaper articles, so the survey continued without my having to publicise it. In 2001 I created a website, for which I bought the domain name <http://www.glowworms.org.uk/> as I wanted a name which would be easy to mention on the radio or in a newspaper article.

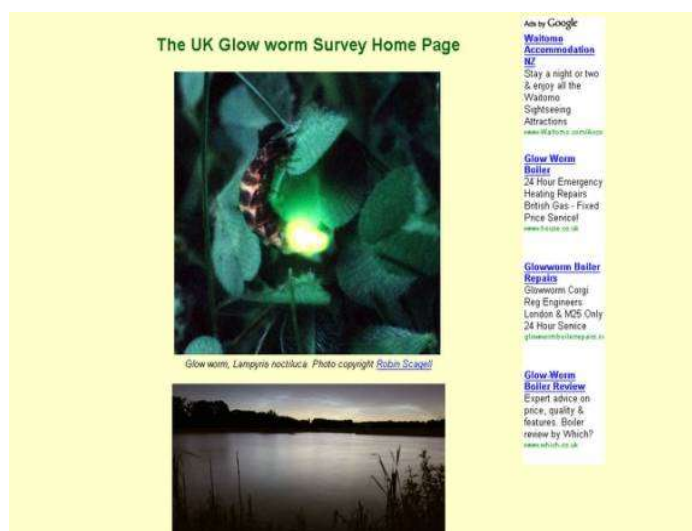
Now, most people if they want information look first on the web, and hopefully will find the site fairly easily. As a result I now get a constant stream of reports year after year, as the site becomes better known. I have made no particular efforts to get it ranked on Google, other than sending them the URL when I began it, but it has just gained its own momentum. Currently I get about 50 new

visitors a day. of which 51% come from the UK, 16% from the US and the rest from other countries, France, Portugal, Spain and Germany being the next most important, though we are only talking about a few percent for each of those.



Yearly statistics for the website show a peak in summer when glow worms are visible

Here is the top of the home page, which at the moment is one long page rather than lots of smaller ones. As you see, I have Google Adwords on it, which bring in a small income because they are not usually directly relevant to glow worms -- about \$5 a month, which I only get every couple of years when it builds up to \$100! It's better than nothing, and is the only funding of any sort that I get, which as I will mention does limit the effectiveness of what I can do. So far I have not had any criticism about the Adwords.



People fill in an online form, in which I ask for details of the site and its aspect, and numbers seen. One thing which I particularly need is a six-figure map reference, which is accurate to 100 metres, using what is called the Ordnance Survey national grid system. This is quite easy to find these days using online maps, and I describe the process on the site. This is one major and important aspect in which my survey differs from the earlier surveys, which often only referred to a town or village. But what interests me is the possibility to go back to a site and count the number of glow worms present in the future, and you really need a very accurate position to make that possible. So I try to make sure that the position is accurate, and these days I always check the position given, as it is wrong a surprising number of times, even when sent in by recorders whom one would expect to know what they are doing. I can now do this very quickly online, and even if the map reference is not given I can use the observer's UK postcode, which is often specific to a street or part of a street. This is not precise, but combined with the verbal descriptions of the site it is better than nothing.

County:

Ordnance Survey Grid Reference (two letters and six numbers, eg TQ 055867. [Click here](#) for help in giving map references):

For new sites, please give details of the location of the site in relation to roads, railways and other nearby landmarks:

Details of visits:

Visit	Date	Time	Conditions*	Males** (on females)	Number of Females (glowing)	Larvae (occasional glow)
1						
2						
3						
4						
5						
6						

Part of the online form

The minimum data I try to get are location, date and numbers of glowing females seen, though there are also columns for males and larvae. The males are usually only seen when they have found the females, and larvae are sometimes evident because they do glow intermittently. I also ask for weather conditions; type of site (eg roadside, nature reserve, garden); presence of nearby water; chemical use on the land; presence of grazing animals; slope if any and its orientation; and presence of artificial lighting. To be honest I rarely look at this data and have not attempted any analysis of it, but it is there for future reference if it's needed.

Most of the people who contribute to the survey are members of the public, and this also represents a difference between my survey and the existing biological recording schemes, which tend to be largely reported by amateur naturalists or by professional workers. They could be people out walking the dog, going night fishing, or simply coming back from the pub. As a result I think I get a wide coverage of ordinary sites, rather than on nature reserves.

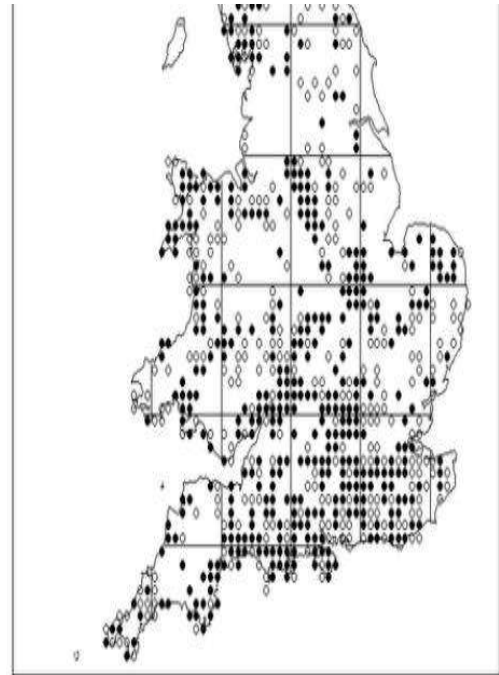
I email all reports to the National Recorder, Keith Alexander, who then forwards them to the Biological Records Centre which is the national repository for recording of data. I don't know what happens to it then, or how much data is recorded. The BRC data is supposed to be accessible online, but so far I haven't worked out how to access it.

Problems with the survey

It won't surprise many of you to learn that the major problem is in the time taken to record the data. I use proprietary software called MapMate, which is designed specifically for biological recording, and it is aimed at recording a wide range of species for a wide range of people. I am not a database expert, but I have enlisted the help of Helen Johnson, who is, and email her the reports for entry into

the database. But she does this on a purely voluntary basis, and we are both behind in checking and recording the data. However, while MapMate allows mapping the distribution over time and so on, it has no facilities for recording or analysing the specific features that we would like to examine, such as the presence of lighting, grazing animals, weather conditions, and even the numbers of males or larvae separately. These data are currently simply not being analysed.

Another difficulty is that a lot of people are concerned that by giving out information about glow worms they may be inviting lots of visitors who will just collect them. I have found no evidence of people collecting glow worms after having read the site, and my feeling is that there is a greater danger to glow worms from people who are unaware of their presence or their life cycle, than from anyone who reads the site. But many sites are also on private land, such as in people's gardens, and of course I don't want to publicise those. So I don't post the survey records on the site itself, and indeed the only information about sites is now very out of date. I

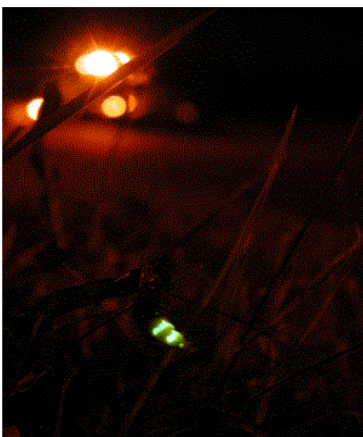


would have to evaluate each site for public access before putting the information on the web, though I would in due course like to provide a list of accessible sites. If the information became freely available through the BRC website I might have a problem, however, with guaranteeing that people will not get unwanted late-night visitors wanting to see the glow worms.

The final problem is that with a private survey, there is no backup or guaranteed access to the data that I am collecting. It's a personal effort, and the data could get lost. It should be copied and stored in a national facility, but this all takes time and money, and I am not happy about letting the original data just go off to someone else only to find that it is unavailable to me and nothing is happening to it. The BRC have said in a note that they think they ought to support the survey, but it would take a lot of effort on my behalf to arrange this, and I am busy enough trying to earn my own living.

What the survey tells us

Because I am receiving reports from the public, new sites are being revealed all the time. A significant number of reports that I receive are from new locations -- as defined by the 10 km square on the BRC distribution map -- or from 10 km squares where they were last seen prior to 1980. Some of those open dots should now be filled, but there are still a lot of parts of the UK where glow worms remain to be found.



One key question that I hoped to answer is whether light pollution has any effect on glow worms. In fact the majority of glow worm sites -- though I don't have specific figures -- are not strongly influenced by lighting, but a number are. Glow worms are not usually found in urban areas, although the vast majority of the public who send in the reports are to be found there. But I once read a comment by the English Renaissance philosopher Francis Bacon who said that glow worms tend to be seen on 'country estates', so maybe little has changed.

Glow worm seen in a hotel car park close to bright streetlights.



Credit Robin Scagell

Another crucial question is the extent to which glow worms are declining in the UK. There is surprisingly little firm evidence. The number of pre-1980 squares on the BRC map suggests that glow worms are no longer to be seen in a lot of places, but the questions remain to what extent and why. We need to get the original data for those squares, and examine the old sites very carefully. Just because glow worms are not seen in a location on one night does not mean that they have gone. Numbers can vary widely. I am also

not sure to what extent the original data is accurate enough to be able to help. We need six-figure map references to each site, but I fear that a lot of records are not precise. One major list was published in a magazine called *Country-side*, which is the journal of the British Naturalists' Association, during the 1970s, and based on information supplied by its readers. But often only the name of a town or village is given, and the original data seems to be lost.

As for reasons for decline, of course there is no one single cause. Probably changes in land use come first, including habitat destruction and fragmentation. Some sites near towns are being built on, while others in the country are threatened because of the lack of grazing by sheep on open downland. Fragmentation is a problem. Large sites are fairly uncommon, and the majority of sites I know of are isolated, with small numbers in each colony. As such they are island populations, as the females don't fly, and this can't be a good thing. I think that translocation of females is an unlikely occurrence, so each population consists of a very small gene pool.



Then and now. The Chiltern Hills at Whiteleaf Cross (white mark on hillside) in 1910 (left) and recently. Much of the hillside is now covered by trees. Photos supplied by John Tyler

Over the past 50 years, there has also been an increased use of chemicals on the land, though I suspect as glow worms have always been found on non-agricultural land or around field margins, this is not too significant. The effects of light pollution are also uncertain, but maybe overlaid in that distant lights seem to have little effect on glow worms, and there is still far more countryside where there is no immediate lighting than streetlit areas.

Climate change could play an increasing part. We always used to joke about typical British summers, in which you always had to carry an umbrella to the beach, but things are changing. In 2003 we had a major drought in the southern half of England which extended from July well into October. Any larvae hatched out then would have found it hard to find any molluscs, and indeed in 2005 and 2006 the numbers in many areas were down on the figures of a few years ago. We had a drought in the summer last year as well, and everyone saw their lawns go brown. But this year has been more typical, despite an unseasonable hot spell in April, and numbers seem to be recovering. Of all the factors affecting glow worms, I think this is the primary one that causes variations from year to year.

Summary

I think on the whole that doing a public survey like this is a good thing, as it provides a means for the recording of data which might otherwise be lost. The media in the UK at least are very receptive to stories about glow worms, and indeed about wildlife in general, and the public are also mostly helpful and concerned.

I often get reports from other countries, notably the US, but I don't know anything about the Lampyrids in those countries and can't help to identify them. I do put some reports on my website as a means of record, but I don't make efforts to get exact locations.

I would like to see similar surveys in other countries, as indeed happens in some cases. Setting up such a survey is not hard, and it is easy to get publicity for it, but you need a long-term strategy for recording and archiving the data. Many academic projects are funded by the year, which doesn't make it easy to keep things going, so privately organised surveys such as my own may be the way forward though there is a risk that the person collecting the data will be unable to continue for any number of reasons.