



## Jennifer Owen's Studies<sup>1</sup>

Dr Ken Thompson

Reviewed by Steve Head

A great deal of what we know about garden biodiversity comes from a single garden in Leicester belonging to Jennifer Owen. Owen graduated in zoology from Oxford in 1958, followed by a PhD at the University of Michigan. In 1962 she moved to the University College of Makerere (now Makerere University), Uganda, and then to Fourah Bay College (shortly to become the University of Sierra Leone). It was in Sierra Leone that she first noticed that there seemed to be more wildlife in her garden than in the neighbouring forest. This prompted her, when she returned to a post at Leicester University in 1971, to wonder exactly what lived in her garden, and to begin a study that was to occupy the next 30 years.

### Owen and her garden

Jennifer brought to this endeavour a unique combination of traits: a thorough academic training in zoology, a passion for both natural history and gardening, and what turned out to be almost superhuman staying power. Few enough of us would contemplate trying to assemble a complete inventory of the beetles, birds, butterflies (and a great deal else) in our gardens for even one year; to persist for 30 years is an achievement that will probably never be equalled. Even more important was a recognition, long before 'wildlife gardening' was fashionable, and 14 years before Chris Baines' first ever wildlife garden at Chelsea, both that gardens were an important but completely unrecognised habitat for our native wildlife, and that this did *not* depend upon trying to create bits of 'fake countryside'. Owen's own Leicester garden was, and is, a neat, productive suburban garden of only modest size, devoted to growing flowers and vegetables.



Two views of Jennifer Owen's Garden

Her only concessions to traditional ‘wildlife gardening’ were to avoid pesticides and excessive tidiness – keeping pruning and clearing to a minimum, and delaying until winter if possible, while growing a wide range of herbaceous plants, trees and shrubs, keeping every square inch covered with plants.

### Reporting the results

From the start Owen reported her findings in scientific journals, but she soon also began to communicate with a wider audience of gardeners. Early results were pulled together into a book, *Garden Life* (1983) for Chatto and Windus, and there were numerous articles in *The Garden*, *New Scientist* and a long series in the magazine *Organic Gardening*. The culmination of years of hard work, in 1991, was the monumental *The Ecology of a Garden: the First Fifteen Years*<sup>2</sup>, published by Cambridge University Press. This remains compulsory reading for anyone seriously interested in garden wildlife, and was at the time the most complete account of the wildlife of any garden anywhere in the world. After a further 15 years, the complete story was made available in the RHS book *Wildlife of a Garden, a Thirty Year Study*<sup>3</sup>. Thirty years is long enough to record many changes, the reasons for some obvious, some less so. For example, the onward march of climate change is clearly shown by the arrival in the garden of gatekeeper and speckled wood butterflies, the former the most abundant butterfly in the garden (apart from the dreaded whites) when the survey ended in 2001.



The covers of Jennifer Owen’s two most influential books.

### Some facts and figures

Over the whole 30-yr period, Owen recorded 2673 species: 474 plants, 1997 insects, 138 other invertebrates (e.g. spiders, woodlice, slugs) and 64 vertebrates (54 of them birds). In some groups, such as harvestmen, butterflies, moths, hoverflies, bees and ladybirds, this represents a quarter or more of the total number known from the whole of Britain. But this is only the tip of the iceberg, because no attempt was made to identify or count many large groups of insects.

For three years only, Owen made a detailed study of one large family of parasitic wasps, and found 533 species, including seven species new to Britain and four new to science. And if mention of the word ‘wasp’ makes you reach for a rolled up newspaper, don’t worry – most of these wasps are small and quite harmless, unless you’re a caterpillar or an aphid, and in

fact make up one part of your garden's free, volunteer pest-control service. You may not know they're there, but you would soon notice if they weren't.

### **BUGS biodiversity**

The biodiversity in Jennifer Owen's garden is indeed remarkable. But how does it compare with other gardens, and in particular is there any reason to think Owen's garden is in any way exceptional?

The Sheffield BUGS survey<sup>4</sup> included 61 gardens (so we would expect to find more than in a single garden), but over a much more limited period (so we might expect to find less), and also employed a much more limited range of sampling techniques (and did not Malaise trap in all of them). One illustration of this latter problem is that BUGS found the familiar garden spider, *Araneus diadematus*, in only three gardens, although it almost certainly occurs virtually everywhere. The reason is simple: none of the trapping techniques employed by BUGS was really suitable for catching animals that neither fly nor spend much time on the ground.

Nevertheless, the comparison with BUGS is instructive. Generally, Owen found more species than BUGS, although not a great deal more (for example, Owen found 183 Hemiptera, BUGS found 135), and not always (Owen's garden had just two species of ants; BUGS found five). In general, one gains the impression that the wider range of sampling techniques and (especially) the much longer sampling period allowed Owen to pick up many more rare species that were present in her garden in only small numbers, and perhaps not all the time. To put those bug data in perspective, for example, Owen sorted and identified all Heteroptera (true bugs) from her Malaise trap for 18 years and identified at least 93 species, but 28 of them were represented by a single individual<sup>2</sup>. It seems reasonable to assume that most of those species (and maybe many of those found only two or three times) would have been missed during the much shorter sampling period employed by BUGS.

In short, there's little in the comparison with the BUGS findings to suggest that Owen's garden was unusually diverse.



**Jennifer Owen's exceptional contribution was recognised in 2010 by the award of the Royal Horticultural Society's prestigious Veitch Memorial Medal**

### **Countryside comparisons**

The Diptera (flies) of Malham Tarn National Nature Reserve in North Yorkshire have been subject to intensive scrutiny for decades, and the total list is far in excess of the number of species recorded in Owen's garden. Partly that's because the garden is much smaller, and partly because only one family of flies (hoverflies) has been studied intensively in the garden. Remarkably, more species of hoverflies have been recorded in the garden than in the nature

reserve. Does that mean Owen's garden is in any sense 'better' than the nature reserve? No, it doesn't, but it does illustrate just how good gardens can be for groups of animals that find the habitat particularly suitable for them.

Ten years after the establishment of Monks Wood Experimental Station in Huntingdonshire (now closed), a record of the flora and fauna of the adjacent woodland nature reserve was published. On account of its much larger area (157 hectares), Monks Wood has more species of most invertebrates, especially of groups like beetles, which are very diverse in woodland. On the other hand, there were more bees and wasps in the garden, illustrating again that gardens are particularly good habitats for these insects. It has been repeatedly shown since that, compared to typical farmland, bumblebees in particular are abundant in gardens<sup>5</sup>.

### **The national picture**

Rather surprisingly, given that Leicestershire is not a notably biodiverse county, among groups that have been thoroughly investigated, the proportion of known British species found in Owen's garden was often high. For example, around a third of all British species of butterflies, large moths and hoverflies. Note these are flying flower-visitors, and both of those things are important. Flying insects are mobile, so Owen's garden presumably sampled (at least to some extent) the species found in a range of local gardens, and even some particularly mobile species from further afield. In addition, the trapping methods employed were particularly suited to catching flying insects. And of course, as we have seen already, flower-rich gardens are ideally suited to pollinators. Thus Owen also recorded a fifth of all British solitary bees, and an astonishing 56 % of all species of bumblebee.

It would be a mistake, however, to assume that the high diversity of gardens is all about pollinators. Owen also found 42 % of all British lacewings and related insects, and over half of all ladybirds; gardens are obviously very good for insects that predominantly eat aphids.

### **Total garden diversity**

Even in Jennifer Owen's garden, about which we know far more than any other, we remain largely ignorant about the total number of species present. Despite an intense effort over a long period, we know that most groups of insects and other invertebrates were sampled relatively poorly or not at all (e.g. the majority of families of flies). Making some assumptions about all these unidentified species, we can guess that 10,000 species of insects may well have at least visited Owen's garden over the 30-yr sampling period.

But we don't know what most of these insects were. Nor do we have much idea how garden faunas turn over as we sample more gardens, or more cities, and thus any idea of the total biodiversity supported by British gardens. We also think we know, from the BUGS project, that characteristics of individual gardens are more important to wildlife than the size and nature of networks of green space of which gardens form a part, but in fact the subject has scarcely been investigated<sup>5</sup>. There remains a lot to learn about garden wildlife.

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<sup>1</sup> Reviewed by Steve Head

<sup>2</sup> Owen, J. (1991) *The Ecology of a Garden: The First Fifteen Years*. Cambridge University Press, Cambridge

<sup>3</sup> Owen, J. (2010) *Wildlife of a Garden: A Thirty-Year Study*. Royal Horticultural Society, London.

<sup>4</sup> See <http://www.bugs.group.shef.ac.uk/> for lists of papers for both series of studies

<sup>5</sup> Goddard, M.A., A.J. Dougill, and T.G. Benton (2010) Scaling up from gardens: biodiversity conservation in urban environments. *Trends in Ecology & Evolution*, **25**, 90-98.