



Newsletter

Number 2 March 2002

A little later than it should have been, but here is this year's BUGS newsletter, for all participants in the project, and anyone else interested in what's been happening on the project over the past year.

Our main objectives in the last year were to extend the sampling programme to provide information on aspects of gardens, and their flora and fauna, which had not been looked at in the first year, to continue the experiments for a second season, and to gather information about the wider environments around the study gardens, and about the scale of gardens as a resource for biodiversity in Sheffield as a whole.

Garden survey work

Invertebrates

In the first year gardens were mapped and surveyed in detail - particularly for their floral composition and habitat features. Sampling of the invertebrates was largely by means of malaise traps, pitfall traps and collection of litter samples. Like all sampling methods, each of these is good for finding some things, and not so good for others. Having run the pitfall and malaise traps for a full season in the first year, we decided that it would be best to use some other sampling methods in the second year, to try and examine the fullest range of invertebrate diversity. To this end we put 'water traps' (yellow trays with salt water in) in the middle of people's lawns for a month over the summer - thanks to everyone who managed to navigate and mow round them without tipping them over! These traps attract and catch flying insects (and were particularly successful with flies). We also put aerial pitfall traps in the shrubberies and hedges of the study gardens. These were designed to sample the invertebrates that live in the vegetation (for example spiders), though in practice they seemed more successful in catching flying things!

Flora

Although the survey work in the first year included plants in gardens (and in some cases this is a long list!) we wanted to extend the coverage and also to obtain some more quantitative estimates of the floral diversity of gardens, in a way that would enable comparison with samples from other habitats. In particular we had not included lawns in the initial flora survey - the identification of plants in a close cropped lawn being both a time-consuming, and rather specialised task. This year, during June, Dr John Hodgson was able to carry out a systematic survey of the diversity of species in all the lawns in our study gardens. Our thanks to everyone who managed to control the urge to cut the lawn for a week or two beforehand - it did make John's task a good deal easier! These data have revealed both a surprising diversity of plants in lawns (the record is 44 in a single lawn), and some interesting patterns in where that diversity occurs.

In addition, we had the expert assistance of Dr Oliver Gilbert, who kindly carried out a survey of lichens in the

gardens. This again revealed rather greater diversity than we might have anticipated, and also turned up a species which looks as though it may well be new to science, clearly indicating that we don't know everything about garden biodiversity yet!

Finally, we drew upon the assistance of garden owners this year to try and obtain data on one of the most difficult groups to sample effectively - the fungi. The difficulty with sampling fungi is that for the most part we have to rely on the fruiting bodies (the 'toadstools') to appear before we know they are there, and these are both unpredictable, and short-lived. This means it is very easy to miss them unless you visit gardens every few days over the 2-3 months when the fungi are likely to be around; clearly an impossible task with sixty or so survey gardens to cover. So instead we supplied garden owners with paper bags and asked them to walk around the garden once a week and pick and dry examples of any fungi (in particular lawn fungi) they found. These dried specimens were then collected, at intervals, for later identification by Dr Tony Lyon. If you were involved with the fungal collections, thank you for your help with that (and if you still have any dried-out fungi in paper bags in the airing cupboard, then let us know and we'll collect them!).

Wildlife gardening experiments

All four of our established experiments continued through the year. The pond and log installations were not sampled, or altered in any way; these will be sampled at the end of the third year. However, in the case of the ponds we did have the encouraging, and somewhat surprising, observation of frogs in at least one of the ponds, despite their 'above-ground' design. The nettle experiments again appeared to have rather limited success with butterflies, though in general there were rather few of the appropriate species of butterflies around. The main change to the experiments was that we expanded the range of nest designs in the bumblebee experiment by building wooden bumblebee nest boxes to a published design, and buried the 'flowerpot' nests in the ground. However the take-up rate of bumblebees in both nest types was as limited as it had been in the previous year.

Assessing garden resources

Although the main focus of our practical work has been on the hundred or so study gardens, in order to place the results from this sample into a broader context, and to judge the significance of the findings for conservation at a city-wide scale, we have also been looking at other ways of estimating the extent and nature of gardens as a resource for biodiversity. In particular we have been using aerial photography and large scale map information available in digital form (urban areas are mapped at 1:1250 scale by the Ordnance Survey) to provide estimates of things such as garden size and housing density, both around our study gardens and across the city more generally. This has been combined with a telephone survey of two hundred and fifty

randomly chosen households, asking people some basic questions about their garden (such as whether the garden has a pond, how many trees there are in the garden). This type of survey, because the households are chosen as far as possible at random, provides data which can, with caution, be extrapolated up to the whole city. These results have provided some of the first general estimates for the role of gardens in providing green space, and other ecologically important features in city areas. For example, we estimate that 23% of the area of urban Sheffield is domestic gardens (about 33km²). There are approximately 25,000 ponds, 350,000 trees, and 45,000 bird nest boxes in gardens across the city, and the equivalent of £40 million worth of labour is invested in managing gardens each year.

Estimates of many of these things have not been made before, but provide an important starting point for judging the role that gardens may play in habitat provision and ecosystem function across an urban area.

The telephone survey was carried out with the assistance of the Sheffield Wildlife Trust, to whom we are most grateful, and we thank the DETR for funding that work. The results of this work have been submitted for publication.

Prospects for this year (2002)

The main focus this year will be on data analysis and interpretation. Identification of most of the sample material we are intending to use is either complete, or nearing completion, and analyses of some of these data is under way. Some preliminary results were presented at the British Ecological Society Winter meeting in December 2001. We are also in the process of obtaining more information on the spatial pattern of garden areas in the areas surrounding our study gardens. This is being done from aerial photographs taken as part of the nationwide 'Cities Revealed' project in 1999 and will enable us to measure how much of the areas around our study gardens is also green space and how fragmented this is.

The experimental work is continuing in 2002. The ponds and logs will be sampled this year, and the bee nest and nettle experiments have been altered slightly to test additional effects. In the case of the nettles, we are introducing variations in the size of the nettle patch to see if this has any effect on the butterflies. The nests for solitary bees and wasps are again being put into gardens, using a single nest design, but we are expanding the coverage to include many more gardens. Finally, the bumblebee nest experiment is also being extended, using the same wooden nest box design as last year, but we are now going to test the effect of providing old mouse bedding as nest material in the boxes, which is supposed to encourage bumblebees. Each garden with a nest box, will now have two, one with and one without nest material in. We shall see if it is the smell of mouse that works for bumblebees!

Outputs, presentations and media interest

Preliminary results from the project have been presented at several meetings, but it is in the nature of a project such as this that most of the information comes in at the end. Through the latter part of this year the main results should begin to take shape. As the year goes on we will continue to write up the various components of the work for publication in academic journals, and to present the most widely relevant

findings in other, more widely accessible forms. Those of you who have access to the BUGS web site (address below) will be able to keep tabs on what is coming out by checking there. We will also be producing a printed summary of the results for all those who have participated in the project.

There has been a steady interest in the project from the media, and you may have come across references to the work in the press, or even heard the project discussed in the last of Chris Baines' series of radio programmes on wildlife gardening on Radio 4 in the autumn. There is clearly a good deal of interest in the topic, but as this year goes on we hope that we will be able to focus these media reports on the results, which has been difficult to do up until now - thousands of specimens in sample bottles are impressive to look at, but don't easily boil down to a media friendly soundbite!

The future

Although the funding for the main BUGS project finishes at the end of 2002, we feel that the project has established a significant scientific case for further work on understanding the role of gardens in urban conservation. There are various questions highlighted by the results we are getting, which would benefit from further exploration. Various agencies have expressed interest in supporting aspects of future work, though no future funding has yet been committed. However, we will, over the course of this year, be exploring the possibilities of developing the work, both here in Sheffield and possibly in contrasting urban areas elsewhere in the UK.

Finally...

As always we are deeply indebted to the willing garden owners of Sheffield for giving us access to their precious plots and tolerating not only people turning up to poke around in their gardens, but also being given various bizarre bits of sampling apparatus to look after. In addition, we gratefully acknowledge the work of the experts in various plant and animal groups whose identification skills have made it possible to quantify garden diversity in some of the difficult and often neglected components of the flora and fauna. Thanks to both sets of people, and to everyone else who has been involved over the last year.

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