

Progress so far

The RHS Plants for Bugs study, started in 2010, has completed two out of the three years. In this time:

- ❖ More than **4,900 individual flying insects** have been recorded visiting plot flowers, including 13 species of butterfly and 13 species of bumblebee.
- ❖ The Vortis suction sampler has captured **27 species** of spider from the plant foliage.
- ❖ More than **300 species** of ground-dwelling insects have been caught in the pitfall traps, 40 of which are ground beetles.
- ❖ So far across all the plots, more than **400 slugs** have been trapped.
- ❖ In total more than **34,000 insects** have been recorded in the first two years. Year two showed a **30–40 percent increase** in numbers and species of invertebrates as the vegetation matured.

Encourage invertebrates by:

- ❖ **Clothing fences and walls** with climbers such as clematis, honeysuckle and ivy to create habitats for spiders and insects.
- ❖ **Making 'bug hotels'** out of tubes filled with hollow straws and corrugated paper.
- ❖ **Vary the substrate:** leave some soil bare, give other areas an organic mulch to cater for ground beetles and other soil-surface species.



Identifying organisms collected up to six times a year from the trial plots.



'Garden-like' plots of native, near-native and exotic garden plants have been created at RHS Garden Wisley (here, and below) and at nearby Deers Farm.

NEW SERIES: LIVING GARDENS

Plants for bugs

In the first of a new series looking at gardens as living ecosystems that support a wide range of wildlife, *The Garden* highlights an important ongoing research project by RHS scientists to assess the value of native and non-native plants to garden invertebrates

Author: **Helen Bostock**, Senior Horticultural Advisor, RHS Garden Wisley



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The site at Deers Farm, Wisley village. The RHS Plants for Bugs project will help gardeners understand the value of their plants to garden wildlife.

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Wildlife gardening has perhaps only recently received credence as a topic for serious scientific study.

This is unfortunate, since the combined area of British gardens forms a huge habitat – there are an estimated 16 million domestic gardens in the UK, containing hundreds of millions of plants.

This article is the first of a new series looking at different aspects of gardens as ecosystems. It will show how we can all manage our gardens to maximise their potential biodiversity, whatever their size, style or contents. 'Wildlife gardens' do not have to be unkempt and lacking in colour. As the series will show, every garden supports native wildlife, often in more diversity than intensively managed farmland nearby.

While the numbers of gardeners interested in encouraging wildlife into their gardens has grown in recent years, they are not well served by advice based on

solid, scientific data. Most points of view rely on hearsay, assumptions or secondary evidence (where the wildlife element was not the main focus of the research).

Need for research

In particular, a debate has raged over whether successful planting for wildlife hinges on the use of native plants. Research at the University of Sheffield in the first decade of this millennium (the Biodiversity



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in Urban Gardens in Sheffield or BUGS study) showed that gardens, by virtue of their diverse habitats, can support high wildlife biodiversity even in built-up areas. But a question mark remains over the role of different plants in British gardens.

British gardeners pack their plots with flowers from all over the world – some 70 percent of plants in an average garden are non-native – but a rigorous, scientific study to shed light on their value to wildlife was needed. Thus an RHS scientific experiment, 'Plants for Bugs', was created, aiming to begin to answer the question of whether native or non-native plant communities support the most wildlife. The results will allow us to advise gardeners on planting for wildlife based on data, not assumptions or hearsay.

So why base the study on bugs? To many of us, the larger vertebrate organisms such as birds, amphibians and mammals are the notable garden wildlife. But look more closely: invertebrates far outweigh garden vertebrates in both number of individuals

and species. By investigating these, the experiment will provide an accurate picture of the role plants play in fostering high biodiversity in gardens. Plants feed many invertebrates, and the invertebrates in turn feed many of the larger animals.

With the help of consultants and other research establishments such as Rothamsted Research in Hertfordshire, the RHS devised a three-year field trial to investigate the impact of different planting schemes on invertebrate abundance and diversity. During 2008/9, a trial plot of 18.3 x 3m (10 x 10ft) beds was constructed at RHS Garden Wisley in Surrey, with a replica site nearby at Deers Farm in Wisley village. Beds are separated by a 1m (39in) wide path, and each is planted with 14 different species of plants (bulbs, ferns, grasses, perennials, shrubs and climbers) to imitate a garden border. Instead of looking at individual plants, we assess how specific groups of plants perform. Plants in any single bed originate from one of three

PHOTOGRAPHS: RHS / HELEN BOSTOCK



Using a Vortis suction sampler to collect invertebrates from trial plots.



Identifying each organism collected is a major undertaking.

▲ Plants for bugs: monitoring

Observation of flower-visiting insects: five times a year, during calm, sunny conditions, the flying insects such as bees and butterflies visiting flowers or resting in the plots are recorded. These insect groups are particularly important indicators of biodiversity, as many are pollinators (see box p72), vital for setting seed and the production of many crops.

Vortis suction sampler: herbivores such as caterpillars and aphids, and predators including ladybirds and parasitic wasps, abound in the foliage layer. They are captured with a vacuum-style Vortis suction sampler (above).

Living Gardens

different geographical regions: Britain (native plants); the northern hemisphere, excluding Britain ('near-natives'); and the southern hemisphere (true exotics). Only a botanist or astute visitor to Wisley is likely to spot the distinction between the plantings, but are bugs more discerning?

Monitoring methods

Recording began in 2010, using four methods (see boxes, right and p71), each repeated up to six times a year between March and October. In addition, the soil/subterranean fauna is being studied as part of a PhD project in collaboration with Roehampton University. This 'top-to-toe' approach to data collection ensures we gain accurate information on the number and diversity of invertebrates using plants or other resources within each bed. Some of the latest facts and figures are shown in the box on p71, with the final results – and their implications – to be published in 2013. ●

NEW SERIES This is the first in a new series of wildlife-related features. Next month, ecologist Steve Head explains how gardens can, and should, be viewed as ecosystems.



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RHS Senior Entomologist Andrew Salisbury identifying insects.

▲ Monitoring ground-dwellers

Pitfall traps: at ground level, pitfall trapping is a standard method that monitors the activity of insects such as ground beetles. The trap, a fluid-filled drinks beaker, is set in the soil in the centre of each plot and left in place for a fortnight before being lifted and the contents counted and identified. This method is tricky to interpret but a vital monitoring method nonetheless.

Slug and snail (gastropod) traps: Although slugs and snails are not encouraged in most gardens, they are monitored in the RHS Plants for Bugs study. Traps (upturned plastic saucers with chicken feed as bait) are set during damp conditions when molluscs are more likely to be active.

► Perfect for Pollinators

The Society launched the RHS Perfect for Pollinators list at the Chelsea Flower Show 2011 to help gardeners select plants that support pollinating insects such as bees, butterflies, moths and hoverflies. The RHS is working with suppliers to provide point-of-sale material and get the logo onto relevant plant labels this spring.

The current list of more than 300 plants is laid out by season. Plants in the spring section include:

- ❖ *Ajuga reptans* (bugle)
- ❖ *Chaenomeles x superba* (quince)
- ❖ *Euphorbia polychroma* (spurge)
- ❖ *Geranium phaeum* (dusky cranesbill)
- ❖ *Malus hupehensis* (a crab apple)
- ❖ *Ribes sanguineum* (flowering currant)

More from the RHS View the full list at: www.rhs.org.uk/plants and follow the RHS Perfect for Pollinators logo.

❖ The Big Wildlife Garden Competition aims to find the UK's best wildlife gardens. It is run by the RHS and The Wildlife Trusts, and is funded by the Department for Environment, Food and Rural Affairs. There are six categories, for all types of garden. The closing date for entries is 20 May. Visit: www.bigwildlifegarden.org.uk



Ajuga reptans.



Chaenomeles x superba.



Euphorbia polychroma.



Ribes sanguineum.



Malus hupehensis.



Geranium phaeum.

RIGHT TO FAR RIGHT: RHS / PHILIPPA GIBSON, CAROL SHEPPARD, LEIGH HUNT

RIGHT TO FAR RIGHT: RHS / CAROL SHEPPARD, MIKE SLEIGH, WENDY WESLEY