What we still want to find out about Gardens and Wildlife

Compiled with the input of all the Forum Trustee board, and Catherine Burton, Mark Goddard Vicky Kindemba, Jeff Ollerton and Mike Toms

There are still many gaps in our scientific and practical knowledge about gardens and their wildlife. Below we have listed just some of the issues we need to address. Some would require sophisticated research studies, many others could be approached through well organised citizen science and observation projects. Please get in touch if you would like to explore some of these questions yourself.

Basic garden ecology

- **Garden food webs, energy flow and species interactions**. We don't know how the way food and energy pass between species in gardens differs in nature or extent from natural or agricultural systems.
- **Garden soil ecology**. Soil ecology is still a bit of a Cinderella Science, and very little work has focused on gardens. It would be good to know more about soil mycorrhizae and other soil fungi, and about the tiny organisms that recycle garden waste.
- **Are garden faunas entirely dominated by generalist species?** The term "common or garden" suggests garden species are general and "ordinary" in their ecology. But gardens are particularly diverse habitats, so are there any species which need this sort of environment?
- **Are some important ecological interactions different in gardens?** For example, Jennifer Owen proposed that hoverflies are now so abundant in gardens that normal Batesian mimicry doesn't work properly any more.
- **How does the size of habitats within gardens** impact on species diversity and populations?
- **Are new sub-species/varieties of invertebrates evolving in garden situations**? The melanistic (black) form of the peppered moth (and some other species) rapidly came to dominate urban habitats covered with soot before the Clean Air Act, and now has declined as habitats got cleaner. Are changes like this happening now?

External changes

- **Effect of pollution (especially air pollution) on garden wildlife**. On the whole we believe this is less of a problem than it was forty years ago, but gardens more or less affected than nearby countryside?
- **Impact of climate change on garden ecology** and the role of gardens in a changing climate. This is BIG topic, and important because gardens could have a major positive role in helping species adapt and migrate, but could also be a source of new invasive species.

Garden Plants

- **Are new sub-species/ecotypes of "weeds" evolving** in garden situations?
- **Wildflower seed packs**. Does planting wildflowers that are not of local provenance in gardens have any measurable genetic effect on local wild flower populations?
- **Are some common weeds so useful for wildlife** that we should perhaps change our attitude to them?

- **The impacts, negative and positive, of garden plant'escapees'** in the wider environment, including - but not limited to - the controversial invasive species.
- **How large do patches of particular plants need to be** to provide a sufficient resource for pollinators or wildlife herbivores?
- **Which named cultivars or varieties of popular garden plants are best for pollinators?** This is a great opportunity for citizen science.
- Why is there so much **difference in attractiveness to pollinators between varieties** of a plant species?
- **Does attractiveness of flowers correlate with the benefits** they produce for pollinators?
- We need to know much more about the **value of common non-native garden plants** (especially trees) as food for herbivorous insects.
- **What do moths nectar on in gardens** apart from the few obvious 'moth flowers'?
- **The value of pollinators to garden and allotment production**, and the resultant value of their produce to the local and UK economy

Garden animals

- **How are garden wildlife populations changing?** Which species are doing well, which badly? And how do trends in garden populations compare with species in the countryside?
- **The diversity of less exciting and understudied garden taxa**. We know a lot about garden birds, bees and butterflies, and much less about everything else. Major groups like flies (except hoverflies) could keep keen garden naturalists busy for many years.
- **How valuable are gardens for bats?**
- **How important is aspect, altitude and habitat structure** compared to plant species composition in determining garden biodiversity? We know these all have a role, but how much, and can we manage our gardens accordingly?
- **Does the presence of frogs, toads or hedgehogs** have any measurable effect on slug or snail populations in gardens?

Garden Management

- **What impact on wildlife do herbicides or pest killers have** if they are only used when needed, and following the instructions properly? It may be less than we assume. And what impact on wildlife do they have if they are over-used?
- **What non-chemical control methods for garden pests work?** What effect do they have on other wildlife?
- **What effects do typical garden management techniques have on wildlife?** For example, does regular digging have measurable advantages or disadvantages for soil and garden ecology compared with low intervention raised beds or "no dig" strategies?
- **Does organic gardening bring measurable benefits** as opposed to wildlife sensitive conventional garden management?
- **What impact does keeping free-ranging chickens have on garden invertebrates?** It would sometimes appear that if you have chickens you don't have anything else!
- **What are the issues of establishing gardens upon rubble** on 'new build' developments? How can such a base be effectively used to establish a successful and wildlife friendly garden? Are there even advantages for diverse lawns?
- **Do neglected gardens host less (or more) biodiversity than typically managed gardens**, and what about extremely highly managed gardens?

- **Effects of garden lighting.** What effects do security lighting and ambient street lighting have on garden wildlife and adjacent habitats? There is already evidence that lighting disturbs normal behaviour and can make some creatures vulnerable to predators.

Garden habitats

- **We need more study of typical garden pond management techniques** and what they imply for water quality and wildlife species
- **Do "bee/bug hotels" actually attract their target species**, and if they do, what impact do they have on the ecology of the target species? Do they displace the population, cause it to increase, or even decrease by concentrating it to the benefit of predators and parasites? If they work, what designs are best?
- **How good are "green walls" for wildlife?** This could examine the value of creepers growing on walls as well as the architect-designed green walls which are beginning to appear. We know green roofs are very beneficial.
- **What is the role of garden compost heaps** in supporting invertebrate biodiversity, and which are the critical invertebrates for breaking down large organic material into smaller fragments, and how does this change over time?

Groups and characteristics of gardens

- **What gains could be made at a community level** by gardeners getting together to link their gardens and adding "missing" elements like ponds or trees within a neighbourhood?
- **Garden landscapes**; how do different garden types and styles, and their spatial distribution and density influence wildlife species diversity and abundance?
- What is the relationship between **householder demographics**/socio-economic status, garden management and biodiversity?
- **How do current trends in decreasing garden size** and infill development affect species diversity and distribution?

Rural gardens

- **Do gardens in rural situations consistently attract different sets of species** compared with from gardens in urban situations?
- **Does wildlife in urban gardens show consistently different phenology** from wildlife in rural gardens? Such as flight periods of butterflies, bumblebees and solitary bees, earlier arrival and later departure in cities.
- We need to know more of **the beneficial 'spillover' effects of pollinating insects** between gardens and agricultural habitats.

Conservation potential

- **Can gardens support the conservation of grasshoppers**? This group has greatly declined as low input diverse grasslands have been agriculturally improved.
- **Can gardens be used to support more conservation priority species?** They are already important for a number of UK Priority Species.
- **How can gardens be used to help species in adjacent nature reserves**?
- **Could planting larval food plants for Lepidoptera in gardens** have any effect on their breeding success/distribution/abundance in the UK as a whole?

Lawns

- What are the **effects of lawn mowing frequency** on plants and invertebrates?
- We need **measurements of how leaving sections of lawn unmown** benefits invertebrates; the factors of duration, season, area, location and species richness and population sizes.
- **What are the best techniques for creating a wildlife friendly lawn** or species-rich grass areas?

People

- **How could more householders be encouraged** to manage their gardens sympathetically for wildlife?

And Finally the Big One

- ***Is all this wildlife gardening effort making UK gardens (and the UK as a whole) better for wildlife?***