

# EVERY GARDEN MATTERS

A blueprint for  
boosting backyard  
biodiversity



garden.  
organic

# Introduction

The title of our 65th anniversary research paper is at the heart of our approach to halting biodiversity loss: every garden matters. They mattered 65 years ago, when our founder Lawrence Hills germinated the seed of the Henry Doubleday Research Association – and they matter today.

Biodiversity is the variety of life on earth in all its forms and includes the ecosystems in which it's supported. Shorelines, peatlands and forests are key ecosystems – but in the UK, we must not overlook the vast potential of gardens, allotments and community growing spaces.

Green corridors begin at home. Backyards, alleyways, allotments, balconies and vegetable beds bind together to form a vital link to the wider world of nature, especially in urban settings. As rural habitats fragment, gardens act as dispersal highways for wildlife to find food, shelter and breeding grounds.

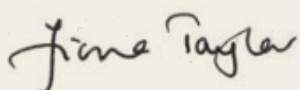
They offer safe passage through human barriers such as roads and buildings. Farmland connects with hedgerows, hedgerows merge with road verges, and street trees interlink with garden shrubs and ponds. And these smallscapes are the connective tissue that protects species diversity and richness.

Figures show global wildlife populations have plummeted by 69% on average since 1970<sup>1</sup>, with the main drivers being human use of land and climate change. In the face of this international emergency, the problem can feel insurmountable.

Our director of horticultural science, Dr Bruce Pearce, has analysed the latest research to provide an in-depth, independent argument on why we need to nurture gardens with organic gardening practices. Through this paper we'll show how small actions - whether that's composting, recycling, saving seeds or planting a tree - can add up to something significant.

There are more than 520 thousand hectares of gardens in the UK<sup>2</sup>. This is just under a quarter of the size of Wales. If each one is managed sustainably and organically, imagine how this can change our landscape and benefit our wildlife.

**The part that all of us can play in tackling the biodiversity crisis begins in our own backyard, be that our own garden or one we're linked to in our community. This paper evidences the collective power of organic growing methods – putting gardeners at the heart of positive environmental action to the benefit of society at large.**



Fiona Taylor, CEO



## About us

In 1958, organic growing pioneer Lawrence D Hills founded the Henry Doubleday Research Association (HDRA). His approach was ahead of its time – calling on ‘everyday’ gardeners to take part in trials to build our understanding of best organic growing practices. This form of research, or citizen science, is now commonplace, and plays a crucial role in modern-day research and development.

In the 65 years that followed, the charity (now known as Garden Organic) has continued to develop organic growing understanding through research and practical application, sharing it with gardeners to implement at home.

With 20,000 members, the charity remains at the forefront of organic growing, leading a movement of citizens keen to play their part in supporting the nature and biodiversity on their doorstep.



Fiona Taylor, CEO



Dr Bruce Pearce,  
Director of Horticultural Science

# Key findings

## Any size garden will do

Big or small, pot or plot - interconnected gardens have a significant impact on biodiversity. Even small urban gardens offer high levels of nectar production, with 85% of the total nectar produced across a city provided by them.

## Plant diversity equals diverse wildlife

The greater range of plants you can pack into your garden the better for wildlife density and soil health. It's also about getting a balance between native/near native and non-native plants. Above ground invertebrates are more abundant under native or near-native plants, and indigenous birds are more successful in breeding in gardens with higher levels of native plants.

## Soil health is better on veg plots

Well-managed vegetable gardens have a similar soil biological quality to a forest. Soil quality and carbon content in allotments is better than in surrounding farmland.

## Take care of your soil to take care of pests

Green manures and organic mulches can enhance soil organic matter, protect the soil and reduce run off. These practices can also reduce the density of pests and protect crops from more extensive damage much more successfully than using toxic pesticides.

### Five garden biodiversity takeaways

1. Plant as wide a range of vegetables, flowers, shrubs and trees as you can, and wherever possible use native or near-native species.
2. Choose a range of plants that flower across the year to provide prolonged food for beneficial insects.
3. Include a diverse range of structures and habitats such as ponds, wood/leaf piles, banks and hedges.
4. Recycle nutrient and organic material within your garden, use cover crops and green manures, and cultivate with a light touch.
5. Don't use pesticides or artificial fertilisers.



# 1. The scale of the challenge

In the past 65 years (from 1958) the UK population has gone from 51.6M<sup>3</sup> to 67.0M (2021)<sup>4</sup> and during that time urbanisation in the UK went from 78.44% (1960)<sup>5</sup> to 84.15% (2021)<sup>6</sup>. Global wildlife populations have plummeted by 69% on average since 1970<sup>1</sup>. During this period there has been a 13% decline in the average abundance of all wildlife in the UK. When we look at individual species, 41% have shown a decrease in abundance and 15% of species are threatened<sup>7</sup>. Starker figures from Germany show a 75% reduction in flying insects in 27 years since the 1970s<sup>8</sup> too.

Across northern Europe, studies have shown that urban gardens can harbour a wide range of biodiversity<sup>9</sup> and contribute to nature conservation<sup>10</sup>. The level of management within the garden contributes to the level of biodiversity<sup>11</sup>, with both positive and negative effects.

However, regardless of what management practices are undertaken in the garden, the impact on biodiversity, and other ecosystem services (see page 8), is driven by what is happening in the wider landscape surrounding any individual garden<sup>12</sup>. So, while this paper refers mainly to the collective impact gardens can have, it's important to note that we would advocate for more organic practice across land management in both urban and rural settings.

There's concern the various activities undertaken by gardeners, such as pest and disease management, and cultivation, can have trade-offs that have negative impacts on the overall delivery of environmental goods and ecosystem services.

However, a study<sup>12</sup> has shown that the synergistic positives outweigh the negative trade-offs. It concluded gardening heavily impacts both animal biodiversity and ecosystem services positively and urban food growing is not at odds with the conservation of biodiversity and ecosystem services.

A study in Zurich, Switzerland<sup>13</sup>, suggests high plant diversity in gardens had a positive effect on soil fauna and soil multifunctionality, but that garden management intensity decreased plant diversity. Indices of biological activity in soil, such as organic and microbial carbon and bacterial abundance, showed a direct positive effect on soil multifunctionality. Soil moisture and disturbance, driven by watering and tilling, were the driving forces structuring plant and soil fauna communities. Plant indicator values proved useful to assess soil fauna community structure, even in flower bed and borders (or in the paper's description - anthropogenic plant assemblages).

The work concluded that to enhance soil functions, gardeners should increase plant diversity, and lower management intensity. Soil protective management practices, such as applying compost, mulch or avoiding soil tilling, should be included in the management of urban green spaces to improve urban biodiversity and nature's contribution to people<sup>14</sup>.

There are disconnects, though, within our urban areas. Urban planning does not currently play much attention to the benefits that domestic gardens, allotments, community gardens, etc, can play in delivering ecosystem services including soils<sup>15</sup>, water<sup>16</sup>, cultural<sup>16</sup>, food<sup>17</sup> and climate mitigation<sup>18</sup>.

From our own membership surveys, we know that gardeners garden for a range of reasons. The scientific literature has backed this up with many seeing it as a recreation with food production important, but not necessarily as a main driver for gardening and allotments<sup>19</sup>.

## 2. Principles of Organic Gardening

There are a number of principles behind organic growing, but the five below are the most important for gardeners. They arise from Garden Organic/HDRA's years of practice and scientific study.

### 1. Build and maintain soil health

The organic way of feeding the soil, rather than the plant, ensures the best results for flowers, fruit and vegetables. The earth you grow in should be teeming with life – worms, fungi, bacteria and other microscopic creatures. These help create its structure and fertility; key components for creating the right environment for plants to root well and gain nourishment. If you look after your soil organically, you will be supporting the activity of these vital creatures and improving their diversity. Crucially, you will be avoiding activities that disrupt or harm the soil's rich ecosystem.

**The four main methods to build the perfect soil are:**

- Add compost and other bulky organic materials - this not only adds nutrients but also helps create a good structure for plant roots to penetrate.
- Minimise digging to avoid disturbing the complex soil life.
- Plan your planting to make best use of the soil's nutrients and to avoid build-up of pests and diseases.
- Grow certain plants, such as green manures, which hold nutrients in the soil and can help suppress weeds.



## 2. Encourage biodiversity

Different life forms such as plants, insects, birds and mammals all have a role in creating a resilient growing system.

- Simply put, 'biodiversity' means many different life forms. For the gardener, increasing biodiversity can be done in three simple ways:
  - Growing different types of plants, so that a variety of flowers, vegetables, trees and shrubs are all present.
  - Providing habitats and food for wildlife such as birds, insects and mammals. Each species has its role in maintaining a natural balance.
  - Feeding the soil life. Healthy soil is full of bacteria, fungi, microbes and creatures, which create the right environment for plants to thrive, releasing nutrients and creating good soil structure.
- With this variety of different species, all working together, organic growing encourages a healthy interdependency between plants and wildlife. This, in turn, creates a resilient growing area.



## 3. Use resources responsibly

Reduce, reuse and recycle is an important part of organic growing. This efficient use of materials and energy helps to maintain the natural environment and conserve resources.

Where possible, organic growers use natural resources, such as wood and plant material, sourcing them locally and using them sustainably with minimum damage to the planet.

**If there's a need for a non-natural resource, such as plastic, then it's important to consider the following:**

- Can I buy a plant-based product instead?
- Is it sturdy enough so it can be repaired or reused? Plastic pots, compost bins and wheelbarrows are good examples of this.
- How do I dispose of it at the end of its life?

Sometimes it's a positive challenge to be an organic grower, one where you can use your consumer power, particularly at garden centres, to encourage organic practices. There are also some organisations that promote careful use of resources in manufacturing, endorsing businesses that seek ways to improve the environmental and ethical impact of their products.

All resources are finite, and waste should be avoided. For instance, the capture of rainwater is invaluable, instead of using precious mains water. Indeed, some natural resources should not be used either, like woodland leaf litter, because they're scarce, or because they're important within their natural habitat.

## 4. Avoid using harmful chemicals

To many people this is the most obvious organic gardening practice. In truth, if you follow the other four principles you'll naturally find you neither need nor want to use toxic chemicals in your growing area. However, persistent pest and weed problems may tempt you to reach for the poison.

**Here are two main reasons why harmful chemicals should be avoided:**

- Pesticides and weedkillers can destroy other life forms. We know neonicotinoids (that are used to kill insects) also affect bees and other pollinators, and toxic weedkillers can harm soil life and create residues in the soil.
- These chemicals can cause serious pollution to soil and water courses – either in their manufacture or from their own residues.

Organic gardeners will tolerate, not obliterate. For instance, some weeds – such as dandelions – are beneficial to pollinators. Others, such as nettle leaves, provide nutrients for the compost heap and can be used to make organic plant feed. Insect pests, such as aphids, are food for beneficial insects such as hoverflies and ladybirds. And even the slug is nutritious for thrushes and ground beetles.

## 5. Maintain a healthy growing area

A diverse and vigorous growing system, good hygiene, and close observation all help prevent problems. Keeping your growing area in good health, rather than just pest and disease free, is at the heart of organic growing. Creating a diverse and vigorous growing system, good hygiene, and close observation all help prevent problems.

**To achieve a healthy growing area, you should:**

- Keep your soil in good condition (see principle 1).
- Source or propagate healthy plants that are well suited to where they will grow.
- Be observant – often problems arise from failing to spot the first signs of disease. Frequent and early intervention prevents problems from escalating.
- Practise good hygiene.



## 3. Ecosystem services

We hear a lot about Ecosystem services in the media but it is often not explained well. So what are ecosystem services? They're defined as 'the benefits people obtain from ecosystems'<sup>20</sup> and are split into three 'digit levels' of i) *provisioning services* such as food, water, timber, fibre and energy; ii) *regulating & maintenance services* that affect climate, floods, disease, wastes, and water quality and iii) *cultural services* that provide physical, recreational, aesthetic, and spiritual benefits<sup>21</sup>. The concept is being continually updated and refined and it can be a useful lens through which to look at the world, our impact on it and how we can reduce this impact and even recover some of the damage we've caused.

### a. Provisioning services

The most obvious provisioning service that gardeners produce is food. Figures on how much food is produced in gardens and allotments in the UK is not easy to find, but a study from the University of Sussex<sup>22</sup> suggests yields of fruit and vegetables produced on allotments can be the same as from commercial production. A study by Sheffield University, which modelled the potential for food production within the city, showed there's more than enough land within Sheffield to meet the fruit and vegetable needs of the city's population<sup>23</sup>. A report on the contribution of food from allotments in Leicester estimated city-wide allotment production of greater than 1,200 tonnes of fruit and vegetables and 200 tonnes of potatoes per annum, equivalent to feeding more than 8,500 people<sup>24</sup>.

Biodiversity is another important ecosystem service and there is plenty of evidence showing the benefits of gardens and allotments. This includes diversity within cropping areas but also rare and important weeds, pollinators as well as predators, and parasites of our crop plants we grow to eat<sup>25-27</sup>.

### b. Regulating & maintenance services

There's evidence that soil quality and carbon content in allotments are better than the surrounding farmland<sup>28</sup>. There's also strong evidence from agricultural studies that the ability of organically managed soils to retain and drain water is better than conventionally managed land<sup>29</sup>. This would suggest that organically managed allotments and gardens could do better in drought, and at absorbing and draining water during heavy rainfall events.

### c. Cultural services

The benefits of being outside (biophilia)<sup>30</sup> and exercising are well known and just the act of gardening can help our wellbeing<sup>31</sup>. Also simply creating and enjoying the beauty of your garden adds to these cultural services.



## 4. Gardening and biodiversity

Biodiversity in the garden can take various forms that can be interconnected, i.e. plants have above and below ground structures that impact on other organisms. To try and simplify things we have broken the information up into different areas where gardens can show biodiversity benefits.

### a. Soil quality and biodiversity

Soil is the fundamental basis of all gardens and keeping our soils healthy and active – teeming with life – produces a good quality soil. A number of studies using gardens, allotments and urban growing areas have shown positive (and some negative) benefits on life within the soil including micro-organisms as well as macro-organisms such as worms.

How the soil is treated and what is grown on and in it will have an impact on its health and condition. Generally heavy management of the soil (digging and other disturbance) will have a more negative impact, therefore you would expect to see less active soil with less biodiversity in a soil that's regularly dug, i.e. in a vegetable patch or flower border rather than under a lawn. However, this is not always the case. A study using microarthropods (small insects, mites and spiders) as an indicator of soil biological quality found that vegetable gardens had similar soil quality to forestry, though geochemical (chemical status) quality was decreased considerably more and so not as good as forestry – though still good<sup>32</sup>.

A Swiss study of urban gardens in Zurich shows garden management is the driving factor influencing soil quality and function. A number of soil quality indicators were used to identify differences in disturbance and intensity of soil use such as digging, hoeing, etc. Highest microbial biomass and soil organic carbon and lowest metabolic quotients were found in perennial grass sites compared to annual vegetable sites.

The grass sites would have been rarely disturbed – think of your lawn – while the vegetable sites would be disturbed regularly. An experiment using decomposition of tea bags showed their decomposition was higher in grass sites, suggesting that the soil has higher biological activity than the vegetable and flower beds. Despite the amount of soil disturbance that the cultivation of vegetable and flower beds receive, there were still more surface-dwelling earthworms (epigeic), than burrowing worms (endogeic) in these beds<sup>33</sup>.

In a Swiss study the soil macrofauna (worms, etc) were shown to have the greatest effect on leaf and plant litter decomposition in urban gardens whereas soil disturbance (intensive soil and crop management) reduced decomposition rates. However, plant species richness (moving away from monoculture) also positively effects litter decomposition by increasing soil fauna richness and microbial activity<sup>34</sup>. In intensely managed urban green spaces such as gardens, biodiversity of plants and soil fauna drives key ecosystem processes<sup>34</sup>. However, another study found no evidence of correlation of epigeic worm abundance and diversity with the areas of a site or soil characteristics. Though it was suggested this might have been the result of the areas studied being too small for an impact to be seen<sup>35</sup>.

A further study showed overall the microbial community composition and the microbial richness of soils from urban allotment gardens in northern Spain were comparable to that in other urban land-use categories that had less human disturbance such as urban forests, grasslands, and agricultural fields. The authors found that within their study the soil microbiology comprised a random assortment of microbes and their interactions, which may be far reaching in the delivering of ecosystem function, although the study was too small to draw firm conclusions<sup>36</sup>.

Studies have shown that allotment gardeners tend to use soil management practices that are conducive to high soil quality. Although soils, and soil types vary across the UK, they have low bulk densities and high soil organic carbon concentrations and density, with organic carbon concentrations 250% higher than in the surrounding agricultural land<sup>37</sup>. By contrast, allotment soils had 32% higher soil organic carbon concentrations and 36% higher C : N ratios (the mass of carbon-to-nitrogen ratio in the soil) than surrounding pastures and agricultural land. This is important because it affects the microbial activity. To stay alive, these lifeforms need an ideal ratio of 24 parts carbon to 1 part nitrogen. Plus, 25% higher total nitrogen and 10% lower bulk densities than the surrounding arable land. Furthermore, other urban greenspaces are as good at storing carbon as allotments<sup>38</sup>.

## b. Plant diversity and soil

Plant diversity in gardens and other environments has been shown to have positive effects on soil multifunctionality and soil organic carbon stocks through increasing the diversity of below-ground organisms. These effects were seen from both native and non-native plants (though to a lesser degree from non-native) and can play a role in mitigating climate change<sup>39</sup>.

The impact of non-native plants was found to have no effect on soil faunal biodiversity<sup>40</sup> so plant selection can be based on other criteria that might encourage biodiversity such as structure or cover. However, other aspects of biodiversity, i.e. pollinators, can be improved by utilising native plants in gardens and allotments.

A wide-ranging international study<sup>41</sup> looking at how biodiversity in urban green spaces can contribute to ecosystem function and services has shown that soil biodiversity increased multiple ecosystem functions and contributed to key ecosystem services such as microbially driven carbon pools, organic matter, decomposition, plant productivity, nutrient cycling, water regulation, and more.

Plant diversity itself influenced multifunctionality via changes in soil conditions that were associated with soil biodiversity and plant interactions. This suggests it is primarily conserving soil biodiversity that's the important factor in maintaining and improving the soil sustainability of urban green spaces.



### c. Cover crops

Green manures or cover crops are used by organic gardeners and farmers for a range of purposes, mainly to improve the soil. However, they also convey a range of other benefits and ecosystem services such as nutrient management, improving soil structure and organic matter content, weed suppression, nitrogen fixation and provision of resources for biodiversity.

The primary use for most organic gardeners (and farmers) will be to improve their soil. A recent review of the benefits of cover crops on soil quality<sup>42</sup> concluded that they enhance soil organic matter, organic carbon sequestration, physical, chemical, and biological properties, and nutrient cycling. Within the review they showed cover crops reduce water erosion by “providing protective cover to the soil, absorbing raindrop energy, reducing soil aggregate detachment, increasing soil surface roughness, delaying runoff initiation, intercepting runoff, reducing runoff velocity, increasing the opportunity time for water infiltration, and promoting the formation of water-stable aggregates”<sup>43</sup>. But also, the increased cover and soil organic carbon (that stabilises the soil to some extent) can protect from wind erosion<sup>44</sup>.

Cover crops are of course used to build fertility and in particular nitrogen. Hairy vetch and crimson clover showed good results<sup>45</sup> as will other legumes. Grasses and other non-legumes do not fix nitrogen, but they can quickly assimilate soil nitrogen as they grow and then release it when incorporated into the soil<sup>46</sup>.

The benefits vary with different cover crops. Suggested cover crops were rye and oats<sup>47</sup>, winter triticale, lentil and pea<sup>43</sup> red clover<sup>47</sup> and alfalfa<sup>48</sup>. Cover crops have been shown to improve water quality, soil fertility, crop productivity and decrease water pollution by reducing water erosion<sup>49</sup>. Again the increased cover and soil organic carbon can also protect from wind erosion.

It's thought early season weed control is best done by cover crop grasses as they establish earlier in the season<sup>50</sup>. Although an experiment in Turkey using oats, hairy vetch, common vetch and ryegrass suppressed weeds by 28%, 73%, 56% and 70% respectively<sup>51</sup>. Some grasses, such as rye, oats and sorghum can also be effective at suppressing weeds by releasing chemicals from their roots that inhibit other plants growth, this is called allelopathy<sup>52</sup>.

Of course, cover crops can also be a good source of nectar and can add to the biodiversity needed to feed the insects in our garden. Studies have shown a mix of floriferous plant species in your cover crop mix can support and enhance pollinators in your garden – as long as they're allowed to flower and not cut and incorporated into the soil before this<sup>53</sup>. Within agricultural systems there's growing evidence that practices such as no-till and cover crops help protect crops from pests by supporting populations of resident predators. Studies in soya and maize have shown promoting cover crops early in the season was better at reducing the density of pests and their damage than using pesticides<sup>54</sup>.

If you want to take a deep dive into cover crops you may be interested in the AgroDiversity Toolbox<sup>55</sup>. This is a website that has been developed over a decade or more of research by hundreds of researchers.



## d. Insects

Studies have shown the magnitude of nectar (food for bees and other insects) production is similar across urban areas, farmland and nature reserves. Gardens and allotments have an important role to play in pollinator conservation as 85% of the total nectar produced across a city is provided by them. Although, as might be expected with our diverse gardens, the nectar supply was more diverse in gardens and allotments and predominantly supplied by the more common non-native flowering plants, which are a key source of nectar in towns and cities<sup>56</sup>.



The size of a garden does not appear to impact on the level of nectar production though it's higher in more affluent neighbourhoods.

Individual gardens vary around how much nectar is produced across the months of the year (with peak production being July) but across a wider landscape the individual peaks and troughs even out, resulting in access to a relatively stable supply of nectar throughout the year. Nectar supply is dominated by non-natives (91%) with shrubs being the most important type of plant (58% of production). While this may sound like a buffet of food for pollinators, unfortunately two-thirds of the nectar is only available to relatively specialist pollinators meaning only one-third is available to all<sup>57</sup> - and shows the importance of native plants in gardens and allotments for pollinators.

There's a question about whether native garden plants are better for biodiversity than non-native plants, particularly for insects. It's been suggested that only 30% of plants in domestic gardens are native<sup>58</sup>. Studies in the UK<sup>9,59</sup> looked at above ground invertebrates and showed abundance was greater under native plants (and only slightly less under near-native) but there were some seasonal differences, with more soil surface active invertebrates under exotics during winter. Overall, numbers increased with canopy cover regardless of where the plants originated from. They concluded that regardless of where the plants originated from the more of them the better.<sup>41</sup>

## e. Birds & mammals

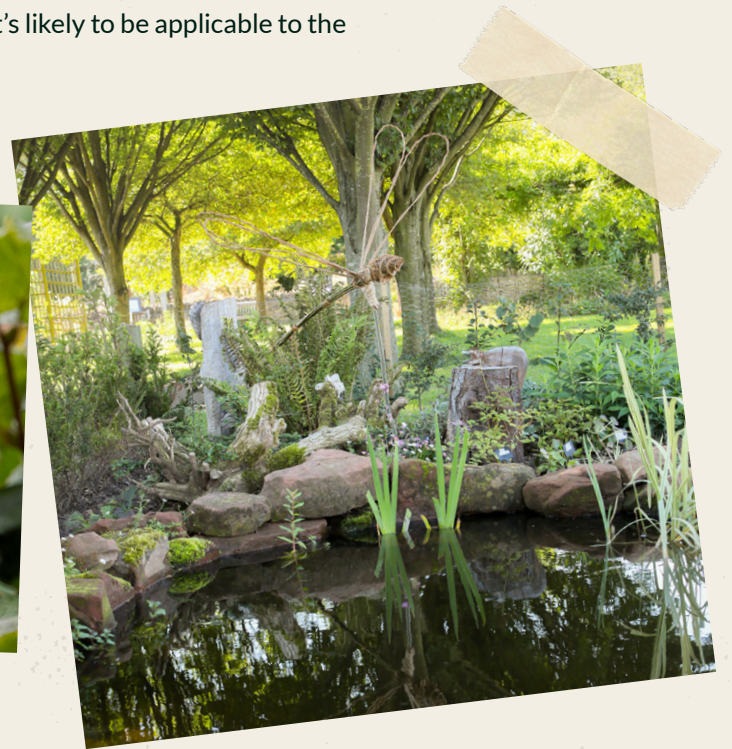
There's growing evidence that species under pressure in the countryside are being found in gardens and allotments, e.g. the common frog (*Rana temporaria*), the song thrush (*Turdus philomelos*) and the hedgehog (*Erinaceus europaeus*). Gardens may also be 'wildlife corridors' between urban and rural areas as well as within urban areas<sup>60</sup>. A German study showed the importance of gardens and allotments for providing habitat and connectivity for hedgehogs. Without them, the ability of hedgehogs to get around the landscape would decrease by 75% and the area of habitat where they would live would decrease by 63%<sup>61</sup>.

There's limited research on birds in gardens but generally when it comes to improving the diversity of birds in your garden the main factors are the surrounding local habitat (woods, parks, urban or periurban)<sup>62</sup> and if you're feeding them. If you feed birds, they will come to your garden<sup>63</sup>. There's also some evidence that suggests the size of the area of vegetation is important, with larger areas<sup>64</sup> and greater density of cover<sup>62</sup> increasing the diversity of birds.

Gardens can and do play an important role for wild birds at different times of year where food and other resources are not readily available in other habitats<sup>65</sup>. However, the major issue for many birds and mammals is the fragmentation of habitats, the size of gardens and, unfortunately, predation from cats<sup>66,67</sup>.

An Australian study suggested the impact of the garden on birds varied with different species being affected in different ways. Native birds showed a preference for native plants but also used many non-native plants. Non-native birds largely utilised non-native plants.

However, different garden characteristics did affect the nature of garden bird species<sup>68</sup>. Not surprisingly, as with pollinators, native birds were more successful in breeding in gardens with higher levels of native plants (mainly due to native plants hosting a higher number of bird food – insects)<sup>69</sup>. This does suggest though that gardens can be designed and managed to favour particular species and gives gardeners a potentially substantial role in the conservation of urban native birds. While this study was based in Australia, it's likely to be applicable to the UK situation.



## 5. Landscape

The role of the wider landscape and its connectivity in the conservation of biodiversity has been seen in both rural and urban areas. In rural areas a large study showed organic farms generally supported more biodiversity when they were grouped together<sup>70</sup>. In urban settings, studies have shown both private and public gardens are important for biodiversity, with private gardens being disproportionately beneficial when compared to their overall size<sup>71</sup>, but the role of 'green corridors' or areas of land linking both public and private green areas are critical in the conservation and promotion of biodiversity in urban areas<sup>72-75</sup>.

## 6. Social

A study in Germany showed that (peri) urban agriculture (PUA) contributes to ten key societal challenges of urbanisation: climate change, food security, biodiversity and ecosystem services, agricultural intensification, resource efficiency, urban renewal and regeneration, land management, public health, social cohesion, and economic growth. The value of PUA is its multifunctionality in providing social, economic and environmental co-benefits and ecosystem services. When implementing PUA, social, institutional, economic, technical, geographical, and ecological drivers and constraints need to be considered<sup>76</sup>.

Studies have shown those engaged with nature, in which attentiveness to biodiversity is explicit, i.e. citizen science, have a greater knowledge of biodiversity than those where biodiversity is implicit, i.e. community gardens, allotments, etc. However, it was found that people experiencing nature as part of a daily routine, whatever the type of experience, were more connected to nature and more likely to implement active pro-biodiversity practices<sup>77</sup>.

## 7. Conclusion






This selection of mounting evidence demonstrates the positive impact gardening can provide. And, hopefully, it also offers a welcome boost for anyone who has had a ‘head in the hands’ moment, wondering what the point of our small-scale intervention is in the face of such a global crisis<sup>78</sup>.

Gardens matter. How we tend them, day-in-day out, matters. As an organic gardener you are a crucial part of the solution.

*Dr Bruce D Pearce is the director of science at Garden Organic/HDRA. He has more than 30 years’ experience working in organic horticulture and agricultural research.*

### Five guiding principles to halt biodiversity loss

Here’s a reminder of our five guiding principles to halt biodiversity loss:

- |    |   |   |
|----|---|---|
| 1. | Plant as wide a range of vegetables, flowers, shrubs and trees as you can, and wherever possible use native or near-native species. |   |
| 2. | Choose a range of plants that flower across the year to provide prolonged food for beneficial insects.                              |  |
| 3. | Include a diverse range of structures and habitats such as ponds, wood/leaf piles, banks and hedges.                                |  |
| 4. | Recycle nutrient and organic material within your garden, use cover crops and green manures, and cultivate with a light touch.      |  |
| 5. | Don’t use pesticides or artificial fertilisers.   |  |

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