



Pollinators

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Nature is an infinite sphere whose center is everywhere



Meadow brown butterfly *Gonepteryx rhamni*



Buff-tailed bumblebee *Bombus terrestris*



1. The Importance of Pollinators

Without pollinators in this world there would be no fruit, flowers, coffee, chocolate, silk, cotton, fewer dairy products, fewer spices, fewer meat products, fewer medicines, less plant diversity and of course the collapse of many ecosystems.

So, let's choose some key words from above and try to put them into some form of context:

- Cotton for example makes up about 35% of worlds fiber use in T-shirts, socks, fish nets, towels, undergarments, bookbinding and much more.
- Coffee has a world commodity value of about \$100 billion.
- Silk- at least 70 million pounds of raw silk is produced each year.
- About 70% of our medicines come from plant extracts.
- 1/3 of the food we eat is thanks to pollinators.

Even though I personally don't like connecting the natural world to the economic side of things it is worth remembering that pollinators provide work for millions of people worldwide.

POLLINATORS INFOGRAPHIC

Nearly 2.000 Species of butterfly and moth are found within the British Isles.

About 90% of the world's crops depend on pollinators.

The Average honey bee flies between 1/2 a mile and up to 8 miles in search for a rich nectar source.

Over 270 Species of bee can be found within the British Isles.

5 THINGS YOU CAN DO FOR Pollinators

1. Don't use pesticides.
2. Leave areas of grass to grow in your garden.
3. Sow wildflower seeds or plant wildflower plugs.
4. Put up bee hotels to attract solitary bees.
5. Plant a range of pollinator friendly plants, trees & shrubs.

Give Nature a Helping Hand with Bee and Butterfly Friendly Plants

Catmint, Achillea, Chicory, Buddleia, Globe Thistle

1.1 Flowers for Pollinators



➤ Flowers are there to attract pollinators through their colour, scent, pollen and nectar rich sources of glucose, fructose and sucrose.

Plants need pollinators to reproduce and to guarantee their survival on earth and without them many of the plants that we love to see in our gardens, parks, open places and in the wild would probably disappear.

Another thing to put into perspective is that for every plant that becomes extinct nearly 28-30 species that depend on that plant could also face extinction.

The Beauty of Flowers



Different flower shapes are adapted to different pollinating insects.



Bowl-shape flower

Examples include Poppies, Buttercups, Pontentilla, Wild and shrub roses, Rock Roses.

Attracts: Bumble bees, certain solitary bees and honey bees.



Lipped flowers

Examples include the Sage family and also the Pea family.

Attracts: Bumble bees and solitary bees.

Note: Pollen from the Pea family can produce high quality pollen which is protein rich helping the bees to be healthier and more resilient to diseases.

The diverse world of flower shapes



Hornet hoverfly *Volucella zonaria*



Members of Daisy Family (Asteraceae), which is a very large plant family group caters for many types of pollinators.

Honey bees, butterflies, solitary bees, moths, mining bee, bumble bees, hoverflies.

LEFT- Globe Thistle
Echinops sphaerocephalus
'Artic Glow'



Teasel family (Dipsacaceae) – which include Scabious plants – field Scabious, Knautia macedonica etc, will attract a variety of pollinators including drone flies, hoverflies, bees and **Lepidoptera** (moths and butterflies).



The Wallflower and the Campion family - Plants with small round flowers and a distinctive small tubular center are mainly pollinated by **Lepidoptera** but also small bees, bee flies and small beetles will also take nectar from such plants.



Deep tube flowers such as Monkshood (please note this plant is poisonous), Antirrhinum and Aquilegia seem to have **co-evolved** with long-tongued Bumble bees (*Bombus hortorum*) for example.

But, you will find other bumble bee visitors as well.

Left- *Antirrhinum* and its bumble bee visitor.



The carrot family (Apiaceae) will appeal to small beetles, hoverflies, small solitary bees. The sea hollies (*Eryngium*) with their larger **florets** will appeal to larger bees.



 There are also certain flowers that make use of special kind of pollen-collecting behaviour called 'buzz pollination' this is mostly done by bumble bees and some **Anthophora** (solitary bees) who vibrate their wings at a certain frequency to dislodge the pollen on plants like Tomatoes, Peppers and Borage.

Left- Tomato plant and its bumble bee visitor.

Plant diversity means a better healthier eco-system for our pollinators, birds, mammals, reptiles, amphibians, fish and other wildlife.





2 Pollinator Decline



There is no doubt that our pollinators worldwide are in drastic decline and face an uncertain future and possible extinction.



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Key factors to their decline:

- 🦋 **Pesticides** – In this section let's start with a quote from the book **The Natural Garden** written by Roger Grounds back in 1976



It worth remembering that, modern pesticides are the brain-children of the second world war. They were originally developed as nerve gases. They were meant to kill people, not pests. You use them at your peril, and not just your peril, but at your children's children peril, because no one knows yet how long these poisons last in the soil, or how long they remain in the bio-cycle.

So here let's talk about two pesticides **Glyphosate** and **Neonicotinoids** and their effect on pollinators in brief.

Glyphosate – a widely used weed killer that is used all over the world, commonly known as **Roundup** has been linked to killing honey bees and other pollinators.

Roundup targets enzymes within in the microbiome found in the intestines of most bees, the chemical reduces this gut bacteria, leaving bees vulnerable to pathogens and premature death.

Neonicotinoids – are a type of insecticide that controls aphids on cereal crops, root feeding grubs and other pest insects. **Neonicotinoids** are basically a nerve agent that affect the central nervous system of insects, causing excitation of the nerves, leading to eventual paralysis and of course death.

This harmful product may be present in the pollen and the nectar rich sources of plants, that will impair pollinator health, homing ability, communication, larval development and their ability to forage for food.

It also effects butterflies and other pollinating insects.





🐝 **Urbanization** - contributes to habitat loss, and that trend is expected to accelerate in coming decades. Previous studies have consistently found a reduced abundance of save food from plant diversity within in our towns and Cities, and where there is food it is more and likely been contaminated from car pollution, toxins and pesticides

- Other factors to take into consideration is distance to nesting areas, proximity to parks and other open spaces, disturbance from traffic, **air pollution**, non-pollinator friendly planting schemes on new projects.
- **Air pollution** for example can destroy the aroma of many flowering plants, impairing the ability of **pollinators** to locate them.

Unfortunately, if our towns and cities continue to be urban managed landscapes then the decline of pollinators will continue.



But, we can choose a different path by promoting functional pollinator ecosystems through our road side verges, pollinator friendly planting schemes in our parks and open spaces and for every new project that happens within our towns and cities.



❖ **Modern farming methods –**

since the 2nd world war farming methods have changed drastically, were once we used

Polyculture system (where one or more crops are grown at the same space and at the same time), to what we see mostly in the countryside now days is the **Monoculture system** (is the cultivation of a single crop at a time), the picture below is a photo of one such crop known as **Rapeseed**, this type of crop may provide food for some pollinators for a few weeks but then become ‘food deserts’ for the rest of the year.

Photo above of pesticide use



Another problem is the dependence on pesticides and fertilizers, for example a Rapeseed field in Sussex used nearly 22 types of fungicide, insecticide, herbicide and fertilizer within nearly a year.

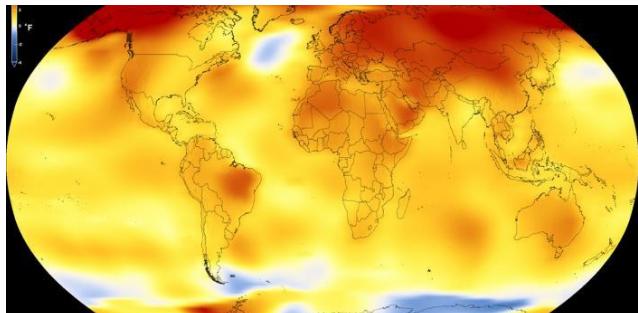


- Pesticide use harms pollinators and other wildlife and artificial fertilizers with their toxic composition of synthetic Nitrogen, Phosphate and Potassium will no dauntedly effect beneficial microorganisms in the soil, what is more worrying is the fact that both artificial fertilizers and pesticides will probably make their way into the ground water and thus leads to water pollution of rivers, streams and eventually ending up in our oceans.

Note: Pesticide runoff is known to effect coral reef growth and reproduction.

- Another reason for pollinator declines within the agricultural land is the probable removal of hedgerows, which can also harbor an array of wildlife including birds, mammals and other insects. Pollinators and other wildlife find refuge within hedgerows, which provides them with a home and food.

If modern day agriculture continues in this way than the natural living conditions of our flora and fauna, will without doubt worsen and ecosystems could collapse leading to extinction of some species.



🐝 Climate change and pollinators-

It is true that due to human activity our world is facing unprecedented challenges and this is also true for our pollinators.

Point being is when temperatures start to elevate some plants may flower less or maybe not at all and pollinators require floral diversity in order to survive.



Let's take bumble bees for example who are specially adapted for colder climates with their thick, fuzzy hair are suffering from extreme heat waves, more than they can tolerate to the point that they drop out of the sky dead.

It is said that bumble bees can travel great distances, more than any other pollinator which is crucial for regions like Southern Spain with its mountains and semi-desert areas where the flora is widely distributed which basically means if there are no pollinators to pollinate such plants then there future is bleak for the plants as well.

Climate change is a global problem for our pollinators that is affecting their very existence on earth.

- Climate warming is in fact changing and altering the distributions of both plant and animal species, to the point that butterfly and other pollinators ranges are shifting northward and apparently tree lines are gradually increasing in elevation.
- Another factor to take into consideration with elevated temperatures is the risk of increased pest and diseases that will affect plants and pollinators alike.

“If we don’t take action, the collapse of our civilisation and extinction of much of the natural world is on the horizon”

Sir David Attenborough



2.2 Pollinator Decline in Numbers



- 蜜蜂 It is said around half of the bumble species in the UK are declining – more than several have declined by 50% within the last 27 years and 3 have gone extinct already.
- 蜜蜂 About two-thirds of our moths and 71% of our butterfly species in the UK are in decline.
- 蜜蜂 Across much of Europe, about 38% to 40% hoverfly, butterflies and bees are in decline.
- 蜜蜂 76% to 78% of the UK's resident and regular migrant butterfly species have declined during the last four decades.
- 蜜蜂 Apparently during a 40-year study of 337 species of moth, 227 = two-thirds were found to be declining & one-third (37%) fell by more than 50%.
- 蜜蜂 A sturdy in Germany found that the abundance of flying insects across the country's nature reserves had plunged by 75% over a 25-27-year period.

The figures above are just a glance of what is happening world wide



Time is running out for our pollinators
we need to be proactive and not reactive.



The picture above should be self-explanatory enough for us to choose the correct path to follow.



3 Helping pollinators

Here is a list of things we can do for pollinators in our public parks, green spaces and our own gardens:



- 🦋 1. If you want to save pollinators then please do not use pesticides.
- 🦋 2. Leave areas of long grass, this in turn can increase bio-diversity by 30-35%
- 🦋 3. Sow areas with wild flower seed or perennial wild flower plugs.



- 4. Leave areas of stinging nettle to grow, as they are an important food source for butterflies and other invertebrates.



- 5. Put up bee hotels for solitary bees but please remember that the hygiene of the boxes is important.



- 6. Wasps can be pollinators as well so please be tolerant of them as they also make great natural predators of unwanted pests in your garden.



- 7. Leave log piles for overwintering bumblebee queens and other beneficial insects.

- 8. Plant various flowering plants, trees and shrubs to provide a rich food source for pollinators for as much of the year that is possible.

- 9. If for example every resident in Crawley planted a bee friendly plant in a flower pot or container, they would in turn be providing an important service to our pollinators. (Home & Food)

- 10. The most important thing is connecting people to nature through education, planting for pollinator schemes and citizen science projects such as the Big Butterfly Count.



We must protect pollinators and preserve biodiversity



4 Green policies

A green policy is a great way to show your commitment to the environment.

Here is an example of Worth Park Gardens Green Policy.



- ❖ Increasing landscape heterogeneity (diversity)
- ❖ Compiling & implementing conservation strategies for pollinators and other beneficial insects.
- ❖ Community science (citizen science) programs with Sussex university.
E.g. Bee beds, in which you collect new censuses of pollinator numbers.
- ❖ To create a generation of gardeners (conservationists), to become not only horticulturists, ecologists but also to be park ambassadors of the environment and its biodiversity.
- ❖ Validating pollinator and insect friendly planting techniques 'learning by doing'. Note: plant diversity means a better healthier eco-system.
- ❖ Zero pesticides – with an herbicide-free control methods put in place.
- ❖ Incorporate monitoring protocols for wildflowers, plant, trees, grasses, fungi, birds and other wildlife (database).

The good thing about green policies is that you can implement these eco-values across all of your green and open spaces.



6 Photo gallery

