



## Insects Crisis: Top 10 Insect Declines Threatening our Planet

Ayesha Azam\* and Ejaz Hussain Bajwa

Department of Entomology, University of The Punjab, Lahore, Pakistan

\*Corresponding Author: Ayesha Azam, Department of Entomology, University of The Punjab, Lahore, Pakistan.

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### Abstract

Insects are among the most fascinating creatures of planet Earth. According to facts, insects comprise more than half of all living things on planet Earth. While some of them are considered pests, many are beneficial and essential for human existence as they contribute massively to the maintenance of food web and biodiversity. Dragonflies help to regulate and monitor the climatic conditions while butterflies are the real source of pollination. However, due to unfamiliarity and lack of knowledge about them, Earth is continually facing the decline due to human actions. In this article, we are exploring some lightening facts of insect's contributions to livability of existence and their decline. Their decline is not making the earth unlivable yet can challenge the survivability of ecosystem and humans due to their harmful consequence.

**Keywords:** Earth; Insects; Decline; Survival; Exploration; Hazard

### Introduction

Yes, you read it right. Do not go on their size, these teeny-tiny insects are not only capable of wreaking havoc and cause such tremendous discomfort with their bite even sometimes by their presence. Insects belong to the class invertebrates, and phylum Arthropoda. They have been on earth more than 300 million years ago even before dinosaurs. Insects play a vital role in driving the livability of our only homeland-Earth. From making possible to produce food by pollinating the crops, aerating the soil and decomposition so that plants/crops can intake nutrients, to maintain the food chain and web, ultimately balancing the biodiversity, they are unsung champions of our ecosystem. They are climate indicators, very prone to adverse climatic conditions. However, there are some insects that pose a threat to public health, property and cause severe economic loss. But still, if we segregate their light and dark sides, we will find the bright part. Their losses can be managed in an appropriate way with least cost, but their absence will make more trouble. You will wonder to know that these tiny titans are responsible for an estimated annual economic value of US\$57 billion [1].

It's not a joke. Next time you witness a butterfly, beetle on your way, be mindful before killing them that they are not just pests,

rather, they are guardians of our world! It's not like they are oxygen for our survival on Earth, but their decline can somehow challenge.

Here is the list of the top 10 guardians of our planet.

- **Honeybees:** Meet the mini honey production powerhouses! Honeybees are tiny marvels of nature valued for honey and pollination.2 Pollination is a process by which flowers can exchange their germ cells from one plant to another to reproduce and diverse. Amazingly, bees are accountable for pollinating one third of our crops including fruits, vegetables, and nuts. That means one third of our food is being produced from bee's hub. Isn't that a big donation? Honeybees are highly adaptable, have organized themselves in a social hierarchy to fulfill the duties assigned them by nature. Interestingly, they are blessed with an exceptional feature on their hind limb to carry the pollens that is "a basket" known as corbiculae or most commonly pollen basket. Basket is entirely dedicated to carry the pollens from plants to hives. Additionally, hind legs have stiff hair like assemblies dubbed as "pollen combs". These combs help the bees to groom themselves, to clear their body from pollen if they got stuck other than the pollen basket. Isn't it an exemplar manifestation of nature?

Honeybees are very sensitive to adverse climate conditions and pollution. Agricultural intensification, Un- judicious use of pesticides even in urban environment, deforestation and colony collapse disorder affect the bees foraging behaviors, ultimately decreasing the honey and pollination rate. These factors are forcing the honeybees towards decline.

- **Butterflies:** Butterflies are certainly called “flying flowers”, exposing their beauty gracefully drifting through air. Butterflies and plants are inter-dependent for so many reasons and have a strong co-evolutionary relationship. They help each other to grow, be diverse, and evolve to survive and thrive and ultimately, play a vital role in maintaining the biodiversity of our ecosystem. Of course, the healthier biodiversity refers to a balanced food web, and robust ecosystem. It is all inter-connected. Other than co-evolution, butterflies have a paramount impact on pollination. Many plants are dependent on specific butterflies to pollinate them and vice versa. Without pollination, plants cannot produce seeds that will ripen to give us food, eventually whole food web will be disturbed. Aesthetics-one of the distinguished features that adorn the butterflies. Vibrant colors, intricate patterns, eclectic array of color hues serve as a great inspiration to ornamentation, textile industry, fashion, and interior designers. Apart from these contributions, injudicious and frequent use of pesticide on plants and crops is a big threat to their survival. However, conservation is already in the ground to protect these fascinating creatures.
- **Bumble bees:** Bumble bees belong to the same genus as *Bombus* and are closely related to honeybees but the thing to mention here is that they do not make enough honey. They are primary pollinators of many wild plants and yes help to pollinate some agricultural crops or plants also. Tomatoes, blue berries, almonds, and other nuts are some major crops which are dependent on bumble bees to pollinate themselves.<sup>3</sup> Without these, the cost of pollination by other means will be extremely high. Bumble bees are easy to recognize from other bees due to their distinctive physical appearance i.e., body is round in shape, furry, and covered in yellow and black stripes. They are famous for their loud, and noisy “buzzzzzz” sound, after which they are named bumble bees. Like all other pollinators, they are also considered as biomarkers of ecosystem, play a vital role in maintaining the food web, biodiversity, and a balanced ecological environment. Conservation practices should be tightened to uphold these bees.
- **Monarch Butterfly:** “Dia de los Muertos”; a dedication to the deceased. It is a religious and cultural ritual believed to be like a family reunion, a day to memorialize the dead individuals of

a family in numerous ways. Not to surprise, in Mexican culture, monarch butterflies are trusted to be the souls of deceased returning to their loved ones to guide them. These spiritual angles have another unique trait to survive themselves that is; two-way migration as birds do. This is a natural occurrence, can be witnessed from their breeding grounds North America to Mexico. They commence a fantastic long journey, wrapping the thousands of miles just to overwinter as a sign of endurance. Aside from the spiritual reputation, monarch butterflies are greatly valued in our food chain for pollination of various crops. Plus, they are considered as indicators of earth health as well as a reliable source of education and scientific research. Cultural significance and migration patterns do not only boost up the educational opportunity in fact has a profound impact on the economy in terms of tourism, food, and education. Sadly, habitat loss, deforestation, and climate change pose grave threats to these little angels of hope and resilience

- **Fireflies:** Romance, love, passion, excitement and just hope-aren’t these auras one reflects after observing fireflies around. What a beautiful sight! Fireflies are illuminating bugs belonging to class insect playing a significant role in eco-health. They and their young ones known as larvae are focal predators of many pests such as small insects, snails, and slugs. Fireflies help to keep balance on pests over-growing population balancing the ecosystem. Likewise, they are s also someone’s preferable prey, even sparkling abdomen make them more attractive to ingest in dinner. In short, they are key components of a neutral food web, discrete biodiversity, and a healthier environment. They are overly sensitive to pollution, particularly to light pollution. That is one of the significant reasons we are unable to enjoy these magical creatures now a days in our urban environment. Artificial light hinders their ways to go back to their homes, to find the mate, which in turn decreases the reproduction, and population. Intensive agriculture, urbanization, pesticide, and chemical pollution are other contributing factors in the decline of these charismatic creatures.
- **Dragonflies and damselflies:** They are the indicators of good quality water and very sensitive to water pollution. If you have never witnessed any dragonfly and damselfly in your neighborhood, then you must think about the quality of air you are breathing in, and quality of water you are drinking. They are voracious predators of many diseases spreading pests and agricultural crops. They themselves are fed upon by numerous aquatic and non-aquatic animals, including birds, fish, and other small animals, serving a key role in the interconnected food web of their habitats. A variety of species with unique and

exquisite coloration increase their contribution to biodiversity. They've been immortalized in countless masterpieces of art, stunning works of literature, and captivating tales of folklore across a myriad of diverse cultures throughout the ages. Heightened pollution and excessive pesticide consumption have threatened their population aggressively and can have severe effects on freshwater ecosystems.

- **Ground Beetles:** Ground beetles hold an immense significance in ecosystem and food web as avid predators, scavenger, decomposer, nutrient cyclers, and soil aerator. They are vital biological predators of various agricultural pests, not only securing the crops from unwanted feeders, in fact also acting as superheroes to protect them from diseases, ventilating the soil finally and increasing the economy. Their presence or absence influences the balance of food webs, and biodiversity dynamics. But climate change and increasing temperatures can alter their distribution because they are extremely specific to their habitat aptness. Temperature has a key role in defining their life cycle, life span, and activity patterns. If we want to save these exceptional creatures, we really need to keep balance in the occurrence of rapid climatic change.
- **Ants:** Ants are recognized as superheroes as they are one of the incredible muscular creatures on planet Earth in the context of their sizes. Would you believe that only a single ant can carry 50 times its own body weight? They are social insects, live in colonies, have specialized casts, and usually work in a group. I wonder how much they can carry as a group. Ants are closely related to nature and have a significant interconnected relationship in the ecosystem and food chain. As they are primarily inhabitants of soil, digging galleries to make nests is their basic duty. This eventually improves the soil structure, water filtration, and nutrient content, which benefits plant health and food quality. They have a considerable role in soil aeration, soil erosion, decomposition, nutrient recycling, and seed dispersal. Ants are known to have nexus with other microbiota of soil such as fungi, bacteria, and other insects. This linkage has an exceptional role in abundance and distribution of these organisms, which have great impact on ecosystem and biodiversity dynamics. Soil pollution, and habitat destruction is widely threatening these creatures.
- **Dung Beetles:** Dung beetles are a crucial illustration of insect world that hold a great responsibility as cultural and ecological figures. They are among nature's clean-up squads, as they help to break down the complex particles of animal dung and recycle into soil, eventually making the soil healthy, balanced, and aerated. They make balls from dungs by rolling, and burry them take feed and lend a room to lay eggs. Decomposing the

dung has various indirect effects other than soil aeration, and nutrient cycling such as instant breakdown will lower the fly population that cause nuisance and spread diseases to livestock. They hold a cultural and symbolic importance as in ancient Egypt, they are linked with *sun god Ra* that symbolizes the transformation and rebirth. It is particularly important to keep check on their decline due to their ecological importance as decomposers, and disease limitation.

- **Moths:** It is not nice to recognize them beastly pests always. Like other family members, they are also associated with pollination (4) and have a strong influence on plants distribution. Moths are usually nocturnal butterflies. Some of them pollinate the night blooming plants. *Bombyx Mori* has a unique contribution is silk production, influencing the silk industry significantly eventually the economy. Their younger one (caterpillar) spins the silk and makes silk cocoon. They have complex relationship with ecosystem and biodiversity as pollinator, decomposer, and food source for bats and reptiles. Light pollution and pesticide consumption are affecting their population instantly.

## Conclusion

There are many other insects out there playing a vital role in maintaining the balance of biodiversity and ecosystems in our lives. Their significance can be overlooked but not compromised by our actions. Our exploits are ruining the little pins (insects) that attach sensitive threads of eco-web. So, we need to double-check, be logical and justify using the chemicals, and expanding lifestyles.

## Bibliography

1. Losey JE and Vaughan M. "The economic value of ecological services provided by insects". *Bioscience* 56.4 (2006): 311-323.
2. Hung KLJ, et al. "The worldwide importance of honeybees as pollinators in natural habitats". *Proceedings of the Royal Society B: Biological Sciences* 285 (2018): 20172140-20172147.
3. Desjardins ÈC and De Oliveira D. "Commercial bumble bee *Bombus impatiens* (Hymenoptera: Apidae) as a pollinator in lowbush blueberry (Ericale: Ericaceae) fields". *Journal of Economic Entomology* 99 (2006): 443-449.
4. Hahn M and Brühl CA. "The secret pollinators: An overview of moth pollination with a focus on Europe and North America". *Arthropod-Plant Interactions* 10 (2016): 21-28.