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IMPORTANCE OF INSECTS FOR HUMANS AND THE ENVIRONMENT

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ABSTRACT *There are millions insect species estimated in the world—and the majority of these have yet to be collected or named by science. Insects are everywhere. They are, by far, the most common animals on our planet. Without insects, the environment could not function as it does. They play a vital role in the health and vigor of our environment. Here is discussed how these numerous and varied organisms are beneficial to humans and the environment?*

KEYWORDS :

We can find insects in almost every conceivable habitat. Their size, shape, color, biology, and life history are so diverse that it makes the study of insects absolutely fascinating. More than 1.5 million species of insects have been named. This is three times the number of all other animals combined. Even so, some say that the insects that have been given names are only a small fraction of the insects in nature. Many are yet to be discovered. When we hear the word "insect" we usually have negative thoughts -- buzzing around, stinging, biting, goo on our windows...those kinds of nasty things. But insects also include wonderful concepts such as butterflies and crickets. But! Insects exist in a realm much greater than human experiences -- they are living, thriving, exchange members of the ecosystem. The most well known insects are those that cause disease or compete for human agricultural products, but these insects represent only a small fraction of the world's insect population. In reality, most insects are *beneficial* to humans and the environment, not detrimental.

As we get to know more about individual species of insects, we grow to appreciate their elegant and sometimes funky design, their life patterns, their work and their mating behaviors. Insects are fascinating to study, and vital to protect by not killing them unnecessarily with pesticides or other chemicals. Without insects, our lives would be vastly different. Insects pollinate many of our fruits, flowers, and vegetables. We would not have much of the produce that we enjoy and rely on without the pollinating services of insects, not to mention honey, beeswax, silk, and other useful products that insects provide. Here are some of the jobs insects do for us ungrateful big critters:

- They give their lives for their fellow critters as food. Birds, fish, toads, lizards, snakes and frogs, as well as many mammals, all depend on insects as valuable sources of food.

- People depend on insects for honey, beeswax, and silk. Our food crops, flowers, and plants couldn't produce seeds without the pollen of nature's busy insects. Insects are also predators of pests that can destroy our gardens -- pests that include other insects, molds, viruses, and other tiny elements in the green and blue environment.

- And many insects also play critical roles in recycling plant and animal materials, eliminating waste, and keeping our soils healthy.

- Insects feed on a seemingly endless array of foods. Many insects are omnivorous, meaning that they can eat a variety of foods including plants, fungi, dead animals, decaying organic matter, and nearly anything they encounter in their environment. Still others are specialists in their diet, which means they may rely only on one particular plant or even one specific part of one particular plant to survive.

- Many insects are predatory or parasitic, either on plants or on other insects or animals, including people. Such insects are important in nature to help keep pest populations (insects or weeds) at a tolerable level. We call this the balance of nature.

- Predatory and parasitic insects are very valuable when they attack other animals or plants that we consider to be pests.

- Insects are very important as primary or secondary decomposers. Without insects to help break down and dispose of wastes, dead animals and plants would accumulate in our environment and it would be messy indeed.

- Insects are underappreciated for their role in the food web. They are the sole food source for many amphibians, reptiles, birds, and mammals.

- Insects themselves are harvested and eaten by people in some cultures. They are a rich source of protein, vitamins, and minerals, and are prized as delicacies in many third-world countries. In fact, it is difficult to find an insect that is not eaten in one form or another by people. Among the most popular are cicadas, locusts, mantises, grubs, caterpillars, crickets, ants, and wasps.

- Insects make our world much more interesting. Naturalists derive a great deal of satisfaction in watching ants work, bees pollinate, or dragonflies patrol. Can you imagine how dull life would become without having butterflies or lightning beetles to add interest to a landscape? People benefit in so many ways by sharing their world with insects.

- Insects may be detrimental only during their immature stage (nymph or larva). During this stage they may appear nothing like the adult. It is important for a pest manager to be able to recognize both the adult and the immature stages as well as to recognize typical damage symptoms in order to assess the need for control.

- Insects are not easily categorized simply by where they occur or what they do. For example, some insects may be pests in multiple settings such as agriculture and urban environments. A few insects may even be both beneficial and pestiferous, depending on where or when they are found.

- Insects represent an important food source for a wide variety of other animal species. Freshwater game fish such as trout, bass, and bream feed extensively on aquatic insects like mayflies, stoneflies, or hellgrammites.

- Many toads, frogs, turtles, snakes, and lizards also consume insects as a major part of their diet.

- Insectivory is common among land-dwelling birds. Purple martins, barn swallows, vireos, warblers, flickers, whippoorwills, and swifts, for example, survive almost exclusively on insects.

- Other birds (such as egrets, quail, geese, plovers, snipes, and bluebirds) have a more varied diet, but they still derive a large percentage of their total nutrition from insects.

- Insects were undoubtedly an important source of nutrition for our early human ancestors. Even today, they are still collected and eaten by people of many cultures. High in protein and low in fat, they may be fried or ground into meal and mixed with flour to make tortillas.

- Ants, bees, termites, caterpillars, water bugs, beetle larvae, flies, crickets, katydids, cicadas, and dragonfly nymphs are among a long list of edible insects that provide nutrition for the people of Australia, Africa, South America, the Middle East, and the Far East.

One of the most important services insects provide is pollination. Though some plants are self-pollinated or wind pollinated, many flowering plants rely on insects to transport their pollen to other flowers, ensuring fertilization. Insects visit flowers to collect nectar, but many have specialized anatomy for carrying the pollen they inevitably brush up against.

- Bees commonly collect pollen in "baskets" formed by stiff hairs on their hind legs or abdomens. Checkered beetles pick up pollen with numerous *setae*, developed scales that look like hairs.

- Some plants, such as orchids, have coevolved with insects and can only be pollinated by one type of insect.

- To humans, bees are clearly the most important pollinator. Without bees, many of the plants we rely on wouldn't be able to reproduce—and produce many of the fruits we eat, such as apples and blueberries.

- Honey bees, which were originally imported from Europe to aid us in pollinating our food crops, have suffered in the past decade from mites that invade their breathing tubes and external bodies.

Insects are also an important part of the food chain and a direct food source for many animals, including humans. Insects such as beetle grubs, termites, and honeybees, are commonly prepared and eaten as food. The foremost food product from insects, however, is honey, which is developed by honey bees from the nectar they collect from flowers—their "reward" for all that pollinating. Another important benefit of insects is their role in decomposition of organic matter. Museum workers take advantage of this fact, using established colonies of carpet beetles to clean skeletons of mammals. Carpet beetles feed on almost anything organic, including cereals, carpets, and dried insects in collections—much to the chagrin of entomologists.

Without insects, Earth would be awash in trash—dead leaves and all manner of refuse are all fed upon by insects. Bacteria are the final decomposers, but efficiency rises when larger organisms first prepare plant material for decomposition, to a large extent by eating leaves and producing fecal pellets. The balance of nature depends on the activities of parasites and predators, the majority of which are insects. Many insects, including caterpillar hunter beetles, pirate bugs, and praying mantises, keep populations of herbivorous insects in check. Equally important are parasitic insects, a prime example being braconid wasps that lay their eggs on tomato hornworms. When the wasp larvae hatch, they feed on the hornworms. Scientists use this concept in biological control with great success. In the past, great emphasis was given to insecticides for control of pest species of insects. Some target insects develop resistance to such chemicals, resulting in the development of "super-bugs" requiring stronger insecticides. Modern thought recognizes the concept of *integrated pest management*—using a variety of control methods to achieve reduction of pest species.

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