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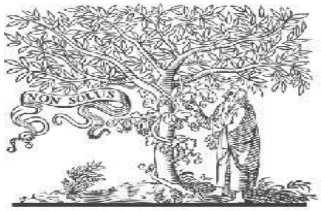

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A STUDY OF EXPLORING THE MYRIAD WORLD OF LEPIDOPTERA

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ABSTRACT
As a result of evolution, the wide variety of life forms on Earth can thrive in a wide variety of conditions. Despite the incredible variety of life on Earth, there are certain things that all organisms have in common. Variables such as temperature and geography have a role in shaping species richness. All terrestrial ecosystems rely on insects, especially the very diverse lepidoptera. They make up the vast majority of described species on Earth and have the greatest diversity among animals. The quick population responses to a variety of biotic and abiotic variables caused by their short generation rates make them a vital tool in ecological study. Butterflies, which are classified in the order Lepidoptera within the phylum Arthropoda, make up the largest family of insects on Earth.

KEYWORDS: Myriad World, Lepidoptera, phylum Arthropoda

INTRODUCTION

From the ocean floor to several miles in the air, from frigid waterways to parched valleys, from subsea thermal vents to groundwater hundreds of feet below the earth's surface, life is found everywhere on Earth. In this way, life on Earth has diversified and adjusted to practically every circumstance. Although there is an incredible variety of life, there are certain things that all creatures have in common. Factors like temperature and geography influence the variety of species found there. Interactions between groups of dependent species that coordinate in various ways provide the appearance of ecological stability. Biological variety may be seen at the ecosystem level, the species level, the population level, and the individual level.

Humans are responsible for the majority of the threats to biodiversity today, including population expansion, climate change, poaching, and so on. If this keeps on for much longer, we may very well discover that many species have gone extinct. Conservation initiatives, such as MABP, are being launched on a global scale (Man and Biodiversity Programmes). The biodiversity may be preserved by the judicious use of land, the establishment of protected areas, and the application of conservation regulations. In 2004, the International Union for the Conservation of Nature (IUCN) recognised a total of 648 animal species as being in danger of extinction. This represents 8.91% of the world's vulnerable fauna (7,266 species). There are 213 mammal species, 149 bird species, 33 reptile species, 148 amphibian species, 75 fish species, 30 invertebrate species, 913 insect species (including 5 Hymenopterans, 4 Lepidopterans, 3 Odonates, and 1 Anoplura), 12 crustacean

species, and 5 mollusk species that are in danger in India. Around eighty-three percent of the endangered species in India are unique to the country. It's concerning that the endemic species in India are at risk, since 29.01% of all endangered animal species are found in India.

All terrestrial ecosystems depend critically on insect life, especially the incredibly diverse Lepidoptera. They make up the bulk of the biosphere's described species and have the most diversity compared to other animal kingdoms. For ecologists, these organisms are crucial because of the speed with which their populations respond to changes in their biotic and abiotic environments. Scientists have calculated that there are now tens of millions of different kinds of insects around the globe. The overall number of arthropod species in the tropics is revised upward to 4.8 million from Erwin's original estimate of 3.5 million. Of fact, no one has ever attempted to count the number of bug species. Therefore, this collective may provide light on the processes and patterns that contribute to biological variety, which might aid preservation efforts.

The exponential increase in the insect population may be traced back to two primary causes. First, insect life cycles are rather brief. The stages of egg, larva, and pupa are completed rapidly. The second factor is that female insects often lay hundreds of eggs at once. Insects, like all other organisms in the natural world, are part of larger biotic communities that form and change through time in specific environments. A large number of insect species, including those that feed exclusively on plants, are confined to a single community type, while others, including many predators, are dispersed throughout a variety of communities with wildly varying floral and faunal compositions. All insect species are confined to relatively small areas, thus it is typical for insect populations to experience significant fluctuations.

ABOUT LEPIDOPTERA

There are several phyla that separate the many species of animals on Earth. The phylum Arthopoda (from the Greek words for "joint" and "foot," respectively) has the greatest number of species. As far as the Kingdom Animalia is concerned, this class of invertebrates is by far the most numerous. From the icy Antarctic to the steamy tropics, in water, land, air, deserts, and high mountains, members of this Phylum are present. The Arthropoda phylum, of which the Class Insecta is a part, has the most varied and highly specialised collection of creatures on the planet. The insect kingdom has more species than any other kingdom on Earth. Scientists have identified and catalogued almost a million different kinds of insects. Several insect species thrive in numerous ecosystems. They are useful indicators of locations with a high concentration of endemic species, and they need protection whether they are the focus of conservation efforts or not. Insects make up around 55 percent of the total number of species in the world, so it seems to reason that they would be particularly abundant in each of the globe's biodiversity hotspots. The insect world has both benevolent and malevolent uses for us. Unknown species account for over 10% of all insect types. It is claimed that many species become extinct before they are even named.

Cutting and burning tropical rainforests alone threatens the survival of at least one-quarter of all species on Earth if the present pace of devastation is not slowed down. Imagine trying to picture life on Earth without insects. Most insects eat plant matter, making them primary consumers and providing protein for the secondary consumers that feed on them. Insects play an important part in the ecological food chain and food webs, in biomass and species richness, as well. They feed on plants, hunt other animals, and in certain cases serve as parasites or plant pests for mammals.

Butterflies have flourished on land, in tropic rainforests, deserts, and grassy land mass, thanks to their amazing and unique adaptations to the wide range of environmental circumstances found on our planet. Hundreds, if not thousands, of species from virtually all known families coexist in nearly all known ecological niches. That's because they have a really special relationship with vegetation. Although butterfly caterpillars have caused some harm, overall insect activity has helped rather than hurt plant growth. Butterflies and bees, for instance, are essential to the reproduction of many plant species because they serve as pollinators.

Lepidoptera is the second biggest order of insects, behind Coleoptera. The order is one of the most well-known and well-disseminated in the insect kingdom. The term "lepidopteron," first used by Linnaeus in 1875 and derived from the Greek words "lepido" for scale and "ptera" for wings, refers to the flattened hairs (scales) that cover the body and wings of most adults of the insect order known as lepidopterons, which includes both moths and butterflies. Butterflies have been extensively researched since they are one of the most well-documented classes of insects. There were 19,238 species known to exist in the globe as of the early 18th century. The constant discovery of new butterfly species and the continuing arguments amongst taxonomists over the status of numerous species both contribute to the list's ever-increasing size. From 1,250,000 to 1,750,000 new butterfly and moth species were named in 2009. The wings and bodies of butterflies and moths are covered in scales, which is only one of their numerous similarities.

ABOUT INDIAN BUTTERFLIES

There are over 870 known butterfly species on the Indian subcontinent, with 285 of them found only in southern India. There are 10 major families of butterflies in India (fifteen families of butterflies are known in the world). The family Nymphalidae currently incorporates numerous former subfamilies. Only five families are responsible for the care of butterflies nowadays. There is a substantial population of all five of these clades in India.

1. Family:

Papilionidae (The swallow tails) (The swallow tails) A total of 19 papilionid species have been identified in this region of south India. The Papilio polymnestor Cramer, often known as the (Blue Mormon), is the biggest and most colourful of the Indian butterflies. They stand out from the crowd and are simple to identify. You're looking at the third biggest butterfly in India. Caterpillars of the Papilio demoleus Linnaeus, sometimes known as the lime butterfly, feast on citrus leaves, making this a stunning species. The

Graphium agamemnon (Linnaeus) Tailed Jay is a gorgeously coloured bird. Polyalthia sp., Citrus sp., Atlantia sp., Glycosmis sp., Toddalia sp., and Murraya sp. are among the host plants for the Black Mormon Papilio polytes (Linnaeus). The larvae of the common swallowtail butterfly, Pachliopta hector (Linnaeus), the "Crimson Rose," feed on the deadly Aristolochia indica plant. Female Black Mormon moths, whose caterpillars eat solely lime trees, might look like the (Common Rose) Pachliopta aristolochiae (Fabricius).

2. Family:

Pieridae In the region of South India, there are 42 different species belonging to the family Pieridae. Their size ranges from tiny to rather large, and their colour palette consists mostly of whites and yellows. Some of them have salmon-colored areas, while others have orange or crimson ones. Larvae eat plants in the pea family (Leguminosae) and the caper family (Capparidaceae). Spots around the wing edges of the common Jezebel, Delias eucharis (Drury), look pink on the top surface and brick-red on the underside. The vivid yellow wings of the common grass yellow butterfly, Eurema hecabe (Linnaeus), are bordered with black. They forage low to the ground, often at the inflorescences of Tridax spp. Common ground-dwelling pierids also include the Plain Orange tip (Colotis eucharis Fabricius) and the Crimson tip (C.danae Fabricius). The larvae of the fast-flying emigrant Catopsilia spp. (Linnaeus) feed on the leaves of the Cassia fistula plant..

3. Family: Nymphalidae

South India is home to 49 different species of the Nymphalidae family of butterflies. Nymphalids are colourful butterflies that range in size from moderate to big. Males of Hypolimnas bolina (Linnaeus) and H.misippus (Linnaeus), the Danaid Eggfly, may be distinguished from one another by the enormous white patches on their wings and the surrounding iridescent blue spots. Flowers of the genus Pansy (Precis spp.), often known as pansies, are small, low-growing, and exquisitely marked.

4. Family: Lycaenidae

There are 46 different species of the lycaenidae family in South India. They're lovely, and you can find them often. They are tiny terflies that might be hard to identify.

5. Family: Hesperiidae

South India is home to 41 species of the butterfly family Hesperiidae, often known as the skippers. Skippers are similarly hard to spot.

6. Butterfly Diversity In Indian Sub-Continent

Naturalists and astute researchers were no longer in the dark about butterflies. Studies of butterfly diversity did not emerge until the early nineteenth century.

To date, scientists have described over 1,74,250 different lepidopteran species; of these, it is believed that 17,950 are butterflies and the remaining species are moths (Palot et al., 2012). Although the tropics are home to the lion's share of butterfly species, variety has been seen on every continent save Antarctica. Table 1.2 displays the number of occurrences of each butterfly family in the World, the Indian subcontinent, and the Western Ghats.

7. Life Cycle Of A Butterfly

The butterfly life cycle skips the nymph stage altogether. As a result, the butterfly is a perfect example of a holometabolous

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insect, meaning that it goes through a whole metamorphosis. Butterflies go through four unique phases throughout their life cycle: egg, larva, pupa, and adult. Insects that are in the process of metamorphosing from larva to pupa are called caterpillars. There are certain species of butterflies that may live for up to a month, however this varies widely. In general, butterflies will have many broods every year, a behaviour known as multivoltinism.

MORPHOLOGY OF LEPIDOPTERA

Caterpillars grow inside of the egg and eventually hatch (eclose). When a caterpillar initially appears, it is in its first instar, and remains so until it moults. After a period of growth during the first instar, the caterpillar moults into the second instar. A new instar is marked by the occurrence of each moult. There are five distinct stages that a caterpillar goes through as it consumes food and develops. From one instar to the next, the caterpillar's overall appearance may undergo remarkable transformations. For instance, a first instar is often unremarkable and has a basic body plan. The second instar may deviate from a standard cylinder form and display a wider range of colours. Some kinds of caterpillars show dramatic changes in coloration between the third and fourth, or the fourth and fifth, instars.

The following characteristics set caterpillars apart from other types of insect larvae:

- Adfrontal suture on the head capsule;
- Six stemmata (eyespots) on the head capsule;
- Silk gland on the labium (mouthparts);
- Prolegs on abdominal segments A3, A4, A5, A6, and A10; or A5, A6, and A10; or A6 and A10;
- Crochets (hooks) on prolegs.

Caterpillar-like insects that live on land and eat plants also exist. Sawfly larvae look like this. It is possible for abdominal segments A1, A2, A3, A4, A5, A6, A7, A8, and A10 to have crochets on the prolegs, however sawflies often have just one or two stemmata, no adfrontal suture, and no such crochets.

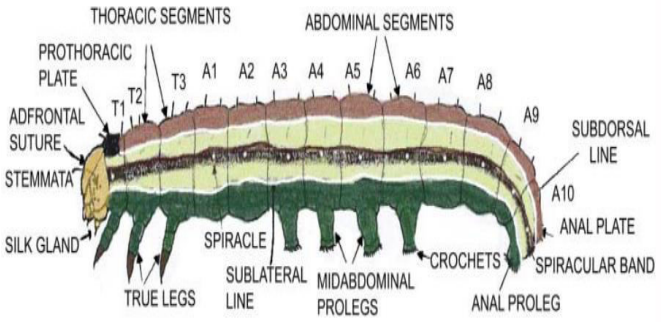

Figure 1 Caterpillar morphology

Caterpillar species may be distinguished from one another and identified based in large part on the morphological differences between their various body components. There are three distinct parts to a caterpillar's body: the head, the chest, and the abdomen.

There are usually six stemmata, or eyespots, on a caterpillar's well-sclerotized head capsule, which is defined by an adfrontal suture in most species. The mouthparts are positioned towards the base of the head, which also has a single pair of short, three-segmented antennae.

The labium, mandibles, maxillae, and uvula all make up the various parts of the mouth. The labrum is the top lip, and it may be notched to help in leaf orientation and proper placement of food between the jaws. The mandibles are a pair of teeth-like jawbones that sit just below the labrum

and facilitate biting and crushing. The maxillae, which sit behind the mandibles, have taste buds and other sensing structures that help animals identify edible from toxic plants. Silk is produced by a gland in the labium, which is positioned below the maxillae. Silk is used to make pads, life lines (see Pero mizon), and cocoons. Caterpillar species may be determined by examining their head capsules and comparing their outlines, colours, hair distributions, and mouthpart morphologies to those of known caterpillars of that particular kind. However, these details can only be seen with a microscope, so we won't be focusing on them here.

Thorax The thoracic spine is divided into three sections: the anterior (T1), middle (T2), and posterior (T3) regions (T3). Every half of the torso (the thorax) contains two separate legs. To move about and hold on to surfaces, the thoracic legs are useful. Some caterpillars, especially those that feed exclusively on leaves, lack segmented legs on their thorax. The spiracle is the external respiratory aperture on either side of the prothorax. Caterpillars may be identified by their morphology, which includes the presence or lack of sclerotized plates, the position of primary setae (and setal clusters), the position, colour, and form of the prothoracic spiracle, and the morphology of the legs (see Peterson [1962] and Stehr [1987] for further details).

CONCLUSION

Over 1,250,000 species are included in the order Lepidoptera, which belongs to the class Insecta (Phylum Arthopoda), and may be identified by the coloured scales found on their wings and bodies. Depending on the shape of their antennae, Lepidoptera may be divided into two suborders: Rhopalocera, which includes butterflies, and heterocera, which includes moths. In contrast to the clubbed antennae of butterflies, the non-clubbed antennae of moths tend to be hairy, branching, or feathery. Moths and butterflies, which thrive in the predominantly subtropical weather of the Jammu area of Jammu and Kashmir, are among the most devastating pests of agricultural crops, horticulture plantation, and forest trees.

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