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REVIEW ARTICLE

BUTTERFLIES AS BIOINDICATORS TO INDICATE BIODIVERSITY HEALTH

Mrs. GRACE BEENA PAUL
Head Dept of Zoology, St.Pious x Degree &P.G College for Women, Nacharm ,Hyderabad India

Mrs. GRACE BEENA PAUL

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ABSTRACT

Several species of butterflies are used by conservation biologists as indicator species to identify habitats that are that are critical and need to be protected .Butterflies are also monitored to indicate climate change and environmental degradation. Butterflies are increasingly being recognized as valuable environmental indicators, both for their rapid and sensitive responses to subtle habitat or climatic changes and as representatives for the diversity and responses of other wildlife. Their abundance and diversity in an area reflects a certain condition of the biodiversity. Environmental factors such as geography, climate and season can also have their impact by influencing the movement, distribution and life cycle of butterflies .The four major types of variation found among butterflies are individual variability, sexual dimorphism, seasonal variability and geographical variability. Let us conserve these charismatic components of biodiversity; the major task of butterfly is to propagate its species. Thus, from Nature's point of view butterflies are a crucial part of our heritage and valuable indicators to the health of the environment.

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INTRODUCTION

Education is a unique investment in shaping the present and future of a Nation. It is invariably linked to all round development of human being .Imparting "quality education to all" is the cardinal principle of National Policy on Education of India .Reflecting the Mission and the objectives of the Institution, Environment initiatives takes center stage. To enlighten the students and community about Earth sustaining behavior and discourage Earth degradation, the college collaborates with State: A.P Forest department, Butterfly Conservation society, National: Center for Environment Education, ITC Ramkay WOW, and International: South Asia Youth Environment Network Organizations. The well net networked intensive extension programs facilitates mutual enrichment of students and community. To enlighten the students and community about earth sustaining behavior and discourage earth degradation,

The young should excel in academics and they are the powerful resource on earth. The powerful resource on and teachers must focus on 3 important aspects:-

1 Vision transforming to reality- and to instill aesthetic sensitivity.
2 Environmental factors and variations.
3 Create a world rich in butterflies for future generations to enjoy-need to Conserve

From time immemorial , butterflies fascinated humankind. Among insects, they are certainly the most popular well known group .Their glowing colours, and delicate flickering movements catch and charm the eye.

Scientific study and documentation of Indian butterflies can be traced as early in 1767,a Danish medical doctor Johann Gerhard Koeing in southern India, he was a naturalist and a student of Carl Linnaes

.India is a vast country with a rich diversity of biotic resources and is ranked one of the 12-mega diversity countries in the tropics. Due to unscientific management of natural resources, much of our native butterflies are fast disappearing. Owing to various reasons such as habitat destruction for 'development' (homes and other infrastructure), fire, grazing and scarcity of both larval and adult food plants, butterfly populations may be severely affected in near future.. a variety of threats from human recreational activities, trampling, run-off from roads, litter deposition and weeds are common factors which affect butterfly populations. Weeds displace plants butterflies feed on. A number of butterfly species are already extinct as a result of habitat destruction during the past several years in India and about 350 Indian butterfly species are included in the red data book.

1) Vision transforming to reality Networking of thoughts towards a common goal for the betterment of human role is indeed the need of the hour. We have the privilege to nurture young minds, the greatest work force of a nation .Endowed with this responsibility; we need to carefully guide this great resource to enhance their creative and innovative abilities. The serene eco-green campus motivated the dept of Zoology to initiate Chrysalis butterfly park in collaboration with Butterfly Conservation Society .The Students were actively involved in identifying different species of butterflies, watching little caterpillars hatching ,growing, pupating and then witnessing the magical moments of the butterfly emerging and finally taking its first flight .

The students are actively involved in butterfly gardening that gives them the real joy of taking part in conserving nature and also gives them great satisfaction watching the delightful creatures.

The students plan the gardening before the rainy season.

- Plant the flowering plants in large groups, so that flowers bloom in sequence to attract butterflies for a longer time. They prefer red, orange, yellow, pink, purple and white of Lantana, Lady 's lace, Marigold, Cosmos, Periwinkle and Crotalaria bushes.
- Besides nectar, several butterflies are attracted to fruits like banana ,pineapple ,jackfruit and guava. These fruits are cut and kept in the garden to attract the butterflies.
- Avoid the use of insecticides and herbicides.
- Plant the flowers in sunny places and provide some rocks or a log of wood, where butterflies can bask in the morning to warm up.
- Sheltered areas, like dense shrubs or hedges to protect them from wind and rain and provide caterpillars a place to pupate.
- Maintaining a damp, slightly salty area in the garden may help attract groups of butterflies.

2) Environmental factors and variations-Variation in size, shape and color and behavior patterns within species of butterflies is quite common. This is due to both genetic and non-genetic factors .Environmental factors such as geography climate and season can also have their impact by influencing the movement, distribution and life cycle of butterflies. The four major types of variation found among butterflies are individual variability, sexual dimorphism, seasonal variability and geographical variability.

Individual variability is common in butterfly species, in case of common Emigrant, a range of colours and patterns is observed in different individuals. Sexual dimorphism is the difference between the male and the female who differ but most of them resemble. The most noticeable difference is in the wing pattern and colours. In some species like the Common Mormon, even the flight is different between sexes. Besides some behavioural differences ,butterflies do not have a constant body temperature. They regulate their temperature bask in the sunlight to increase their temperatures.

3) Create a world rich in butterflies for future generations to enjoy-need Conserve

Educational value

- Butterflies have fascinating life-cycles that are used in many countries to teach children about the natural world. The transformation from egg to caterpillar to chrysalis is one of the wonders of nature.
- Other educational aspects include the intricate wing patterns and iridescence, and as examples of insect migration.

Scientific value

- Butterflies are an extremely important group of 'model' organisms used, for centuries, to investigate many areas of biological research, including such diverse fields as navigation, pest control, embryology, mimicry, evolution, genetics, population dynamics and biodiversity conservation.
- The long history and popularity of butterfly study have provided a unique data resource on an insect group unmatched in geographical scale and timescale anywhere in the world. This has proved extremely important for scientific research on climate change.

Ecosystem value

- Butterflies and moths are indicators of a healthy environment and healthy ecosystems.
- They indicate a wide range of other invertebrates, which comprise over two-thirds of all species.
- Areas rich in butterflies and moths are rich in other invertebrates. These collectively provide a wide range of environmental benefits, including pollination and natural pest control.
- Butterflies are an important element of the food chain and are prey for birds, bats and other insectivorous animals (for example, in Britain and Ireland, Blue Tits eat an estimated 50 billion moth caterpillars each year).
- Butterflies support a range of other predators and parasites, many of which are specific to individual species, or groups of species.
- Butterflies have been widely used by ecologists as model organisms to study the impact of habitat loss and fragmentation, and climate change.

Health value

- People enjoy seeing butterflies both around their homes and in the countryside.
- Over 10,000 people record butterflies and moths in the UK alone, involving getting outside and walking considerable distances. Over 850 sites are monitored each week in the UK and collectively volunteers have walked the equivalent of the distance to the moon counting butterflies.
- Several hundreds of thousands of people garden for wildlife in the UK, many of them specifically for butterflies and moths.

Economic value

- Thousands of people travel abroad each year looking for butterflies and moths. Eco-tours bring valuable income to many European countries and developing countries around the world (e.g. the valley of the butterflies in Rhodes and the Monarch roost in Mexico).
- Every butterfly has developed its own suite of chemicals to deter predators and parasites, find a mate, and overcome the chemical defences of its host plant. Each of these chemicals has a potential value and could be exploited economically. For example, powerful antibiotics have been found in the Meadow Brown, one of our commonest and most widespread species.

CONCLUSION

With the growing human population in India, butterflies are under threat and some are critically endangered. Besides habitat loss the widespread use of insecticides has drastically reduced numbers. Its time to conserve these winged jewels of nature

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