

Conservation of Butterflies in Bangladesh

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ABSTRACT

Butterflies invoke up images of sunshine, the affection and color of flowery grazing lands and summer gardens teaming with life. These are brightly colored flying insects with two pairs of large dazzling wings attract everyone's attention that vary in color and prototype from species to species. They had been and still are the pest collectors treasure for centuries. Actually no garden is complete without them. One often doubts how, with a few leisurely waves of their delicate wings, they gain mastery of the air and put the most sophisticated aircrafts to disgrace. From their artistic value, they are natural pollinators and indicators of forest health. In many countries around the world, well-managed butterfly gardens and butterfly houses are popular tourist attractions. Like other countries, Bangladesh having its humid tropical climate is known to be rich in butterfly fauna. This study entails the conservation of Butterflies on the perspective of Bangladesh.

Keywords: Butterflies, Butterfly species of Bangladesh, Butterfly life cycle, Butterfly Conservation

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INTRODUCTION

Butterflies have been found to be a specific useful indicator group in grasslands and in other open habitats [Figure: 1]. They also react to pressures such as climate change (Corezzola, 2011). Many suggestions have been put forward to explain the origin of the word "Butterfly". The old English name for a butterfly was "Buttor-fleoge" it does not require too much of imagination to derive this from the old French word "Biaute" meaning "Beauty". The present English may be a corruption or shortening of "Beauty-fly".



Figure (1): Butterflies around the world. Source: Internet

Many butterflies migrate through long distances every year, spending the greater part of the year in southern Europe and flying northwards in spring (Chowdhury and Hossain, 2013). Butterflies have been admired for centuries for their physical beauty and behavioral display. These colorful insects frequent open, sunny wildflower gardens, grassy fields, feeding on nectar from flowering plants.

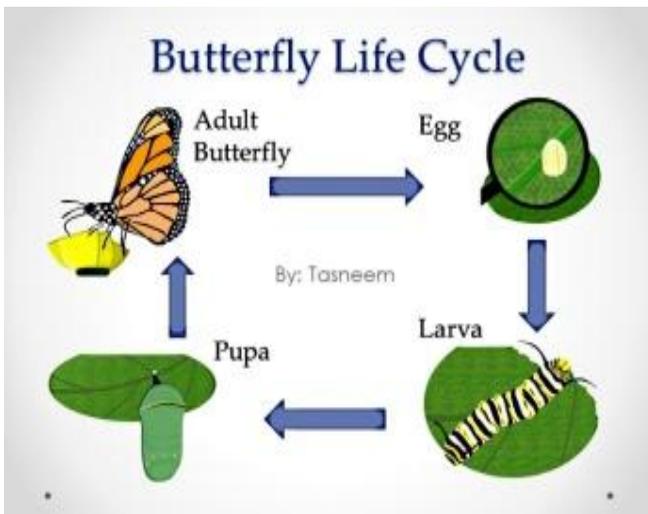


Figure (2): Butterfly Life Cycle



Figure (3): Adult Butterfly
Source: Bashar, 2013 (a)

The life history of butterflies includes extremely short adult life spans in some species. Whereas a four-staged lifecycle and migration and hibernation activity in some species is also seen. The complex butterfly life cycle [Figure: 2], includes existence as an egg, larva, and pupa before developing into an adult butterfly. The life span of adult butterflies [Figure: 3] ranges between one week and eight months, and averages two to three weeks in length (Bashar, 2013.a). The resiliency of some butterfly species is illustrated by their ability to travel great distances. This study attempts to study the conservation and management of butterflies in the context of Bangladesh.

OBJECTIVE

- To study about Butterflies and its impact on nature.
- To identify the values of Butterflies as a biodiversity indicator.
- To understand the importance of conservation of Butterflies in Bangladesh.

METHODOLOGY

The Methodology followed for the study is comprehensive and intensive. An elaborate literature review on the topic was carried out for better understanding and representation of the problem. Due to the nature of the topic, the study based on both primary and secondary data from different sources. The primary data were collected through observation from different Butterfly Parks and Butterfly Conservation Centers of Bangladesh. The secondary data were collected from different books, journals, articles, reports and internet websites.

VALUES OF BUTTERFLIES IN ENVIRONMENT

There are many reasons why butterflies are important which are discussed below:

Intrinsic value: Butterflies are intrinsically valuable and are worthy of conservation in their own right. They are part of Life on earth and an important component of its rich biodiversity (BCE, 2008). They have been around for at least 50 million years and probably first evolved some 150 million years ago. Butterflies a highly diverse group comprising over 250,000 species and make up around one quarter of all named species (BCE, 2008).

Aesthetic value: Butterflies are part of our natural heritage and have been studied for over 300 years. They are beautiful which are iconic and popular. People love butterflies. There are many references to butterflies and moths in literature, from the Bible through Shakespeare to modern day literature, and from poetry to musical lyrics. Butterflies are used by advertisers and illustrators the world over as way of indicating that something is environmentally friendly. Butterflies are often portrayed as the essence of nature or as representing freedom, beauty or peace (BCE, 2008).

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 (BCE, 2008).

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 (BCE, 2008).

Ecosystem value: Butterflies indicators of a healthy environment and healthy ecosystems. They indicate a wide range of other invertebrates, which comprise over two-thirds of all species. 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. Butterflies have been widely used by ecologists as model organisms to study the impact of habitat loss and fragmentation, and climate change (BCE, 2008).

Health value: People enjoy seeing butterflies both around their homes and in the countryside. Over 10,000 people record butterflies 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 (BCE, 2008). Several hundreds of thousands of people garden for wildlife in the UK, many of them specifically for butterflies and moths (BCE, 2008).

Economic value: Thousands of people travel abroad each year looking for butterflies. Eco-tours bring valuable income to many European countries and developing countries around the world (BCE, 2008).

MIGRATION OF BUTTERFLIES

It is a natural process of initiation and the process for maintenance of species richness and species assemblage in an ecosystem. But Butterfly migration is a natural process in an open place which is being modulated by establishing and by ensuring availability of all required necessities and accessories for butterfly-plant interactions. These are host plants, nectar plants, shelter plants, pupating supports and all together abiotic supports. The migration is also required by a balance of maintaining “general equilibrium position” theory for butterfly-plant relationships. The maintenance of plant means plantation, replacement and proper take care of natural vegetation, cultivated host-plant, nectar plant and shade plant in the garden and cultivated forest. We should know about the life cycle of host plants and their diseases in respect to their environment (Bashar, 2013.b).

THREATS OF BUTTERFLIES

The greatest threats to butterflies are habitat change and loss due to residential, commercial and agricultural development. Climate change is also a threat to butterfly (Van Swaay, et al 2010). Butterflies require body temperatures of 30^o-35^oC for optimal growth and development. There are several ways in which climate change may affect butterflies. If the microclimate changes, this will affect their survival. Changes in temperature may result in asynchrony between food sources and breeding, causing starvation of offspring that emerges too early (Van Swaay, et al 2010).

BANGLADESH CONTEXT

A. Butterflies of Bangladesh

Bangladesh with its humid tropical climate unique geographic location is generally known to be rich in butterfly fauna [Figure: 4]. Experts feel that the total number of butterfly species of Bangladesh will exceed 400, of which only about 275 have so far been put on record (Chowdhury and Hossain, 2013). It is said that, butterflies in Bangladesh belong to ten different families. These are Hespertiidae, Papilionidae, Pieridae, Nymphalidae, Danaidae, Satyridae, Lycaenidae, Amathusiidae, Acraeidae and Riodionidae.



Figure (4): Some commonly seen Butterflies of Bangladesh
Source: Arch 4204. 46A, 2014

Butterflies need vegetative parts of specific plant during their developmental stages and flowering plants during the adult stage as food sources (Bashar, 2013.a). In addition to that, they need some selective plants for taking shelter wherever and whenever it stands necessary and essential. To have these types of floral combinations, additive abiotic factors are needed to be available. This means that special type of ecosystem like Forest Ecosystem always stands as more suitable for butterfly habitats and at the same time for butterfly colonization. Once butterfly colonization establishes anywhere, it gives ever glorious beauty in nature (Bashar, 2013.a).

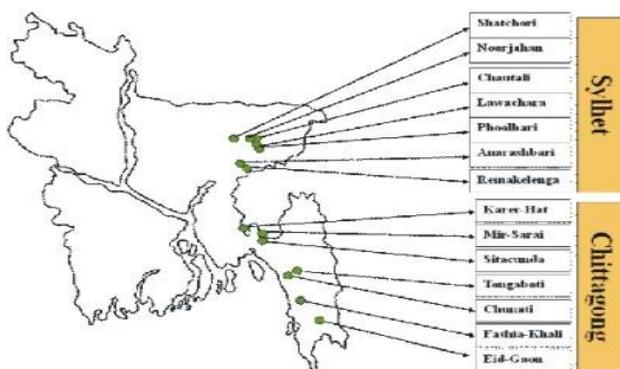


Figure (5): Possible Butterfly Parks of Bangladesh
Source: Bashar, 2013 (a)

Butterflies are the best 'biotic-indicators' of climatic [Figure: 5].

- Butterflies as indicators, increase of species richness and species assemblage have been augmented to 47% in a wild state.
- Butterfly plays a vital role to combine three type of a forestation
- Butterflies are connected to plant life circle and for that they are directly or indirectly related to climatic change.
- The workability and excess amount of butterfly more effective in natures which make them biotic- indicator (Bashar, 2013.b).

B. Butterfly National Parks in Bangladesh

It combines the term *park* both in general and scientific facts. It includes plant-animal associations. It is rather the most scientific approach and tool for the question of nature conservation [Figure: 5]. This park not only gives pleasure to the humans but also creates some natural tools to maintain the species richness in an ecosystem. Aim of a true butterfly park is to create a site for the creation of new species both in the plant kingdom and in the diversity of butterflies as a whole (Bashar, 2013.b).

Following are some of Butterfly Parks described in Bangladesh:

a. Bhawal National Park

The Bhawal National Park was established and maintained as a National Park in 1974. It is located in Gazipur under Dhaka Division of Bangladesh [Figure: 6], approximately 40 km north of Dhaka city, only 20 km drive from Gazipur and 20 km from Kapasia (Bashar, 2013.a). Its purpose is to protect important habitats as well as to provide opportunities for recreation. The topography of this Park is characterized by low hills about 3.0 to 4.5 m high. In the recent time, EBBL, University of Dhaka has started experiments to establish an "Open Butterfly Park and Butterfly Colonizing Centre" in the park and the laboratory has estimated that there are about 300 species of butterflies in the Bhawal National park area (Bashar, 2013.a).



Figure (6): Bhawal National park, Gazipur.

Source: Mondal, 2013

b. Madhupur National Park

The Madhupur National Park is a large upland area in the central part of Bangladesh. This forest has been depleted a lot. Once it had enormous number of butterflies of diverse families with higher number in each of the families and the butterfly population was in jubilant condition by having enough host plants, nectar plants and shelter plants in the wild state. Nevertheless, the EBBL laboratory estimated more than three hundred butterfly species still existed in this forest. In the EBBL research-study about the forest since 1999, it is revealed that the butterfly population depletion is rapid, serious and alarming to be extinct very soon (Bashar, 2013.a).

c. Lawachara National Park

The Lawachara National Park is a major national park and nature reserve in Bangladesh. The park is located at Kamalgonj Upazila, Maulvi Bazar district in the northeastern region of the country Lawachara. It is remarkable to note that, the largest butterfly of Bangladesh the *Birdwings* are found in this forest. A decade ago this forest was with abundance of the *Birdwing* butterflies, but in the present situation their population has declined to the critical condition. This trend has been started in the forest owing to the fact that the host-plant is under a serious threat of the indiscriminant interference of human activities. The *Birdwing* population has been declining alarm since 2001. As per the record of the EBBL, the highest number of butterfly species (more than 250 species) was represented up to 2002 in the forest (Bashar, 2013.a).

d. Satchari national Park

The park is situated in Raghunandan hill, under Habiganj district, under Sylhet Division. Literally "Satchari" in Bengali means "Seven Streams". There are seven streams flowing in this jungle, and the name "Satchari" came from there. Still butterfly population in the forest is rich (more than 200) in comparison to the population in the other forests of Bangladesh. Largest butterflies the *Birdwings* are found in the forest with host-plant bushes. These bushes are characteristics in this forest and that is why

still we have the highest number of *Birdwing* butterflies are seen in this Park. Butterfly populations are still high in the forest but very soon the population decline will be very colossal as the rate of forest destruction has already been started (Bashar, 2013.a).

e. Rema-Kalenga (RK) forest area

Rema-Kalenga (RK) is situated on the southern side of Habiganj districts. But out of all forests under the experimentation of the EBBL, the butterfly population in this forest is less disturbed by the humans. Butterfly estimation is poorly studied in the forest still today. So far the estimation is made by the researchers of the EBBL, the population volume may stand with more than 230 species of butterflies (Bashar, 2013.a).

f. Anarashbari forest area

This station is in Habiganj. Generally, It is a cultivated area. Butterfly population is not rich in the forest, but still there are some species that are confined to the butterfly host plants which are poorly distributed and surviving. The EBBL report states that not more than 90 species of butterflies are estimated in the forest (Bashar, 2013.a).

C. Butterfly Conservation and Research Center

a. Butterfly Conservation and Research Center, Chittagong

It is located at Potenga, Chittagong [Figure: 7]. Total area is 2-5 acres. It is proposed for a butterfly museum and an insect sanctuary along with the farm and the research center (Mondal, 2013). Initially a 2 acres of land is going to be worked on, and there will be provisions for more expansions of the butterfly farm in the future (Mondal, 2013). This site is a few kilometers away from some of the main tourist attractions in Cox's Bazar and there are also many rest houses and hotels nearby so this could be a nice visiting place as well as a research center with full fledged laboratories and classrooms for Entomology students (Mondal, 2013).



Figure (7): Butterfly Conservation and Research Center, Chittagong
Source: Mondal, 2013

b. Butterfly Research Park, Gazipur

It is located at Bhawal, Gazipur [Figure: 7]. Total area is 10 acres. Mainly it is a natural park where not only butterfly but also many animals come for its natural setting. There are 221 types of trees in the park and they are related to butterfly escalation. There are three categories 32 beds provided for butterfly (Mondal, 2013).



Figure (8): Butterfly Research Park, Gazipur
Source: Mondal, 2013

c. Bangabandhu Sheikh Mujib Safari Park

It is located at Gazipur, in Dhaka district [Figure: 9]. Specimen and stuffing of about 2000 species are kept here. The authority has built a herbarium of about 300 types of trees. The tourists, the students, and the researchers can obtain huge knowledge from this museum. Mainly the park is created for wildlife animals but Butterfly Park is one of the attractive parts of this park. The gravity Level is so low down for butterfly flying capacity. Here humidity level is not sufficient for butterfly survival. It is not Eco-friendly. The basic plant for butterfly is not sufficient here and most of the plant dies. Plantation process is not done properly (Mondal, 2013).



Figure (9): Bangabandhu Sheikh Mujib Safari Park
Source: Mondal, 2013

d. Jahangirnagar University Butterfly Centre and Exhibition

Every year a butterfly fair and Birds fair held at Jahangirnagar University [Figure: 10]. Here temporary shell is made for butterfly. Mainly Caterpillars are kept in the shell and are watched them grow up. But most of the butterfly used to die because of Humidity control level. Some photography exhibitions are held in the gallery. Mainly it is for the awareness of the people. There is no water channel for humidity control which is a failure for butterfly's survival.



Figure (10): Jahangirnagar University Butterfly Exhibition
Source: Sonya Afrin [Aurhor1]

RESULTS AND DISCUSSIONS

Although butterflies may seem fragile and vulnerable insects, their capability of adapting to a changing environment is great. With proper conservation measures, we can help them to better cope with ongoing climate change.

A. Butterfly Habitat Management

- a. **Wildflower plantings**-plantation of wildflower gardens that contain an assortment of native trees, shrubs, and grasses are one of the easiest means of attracting butterflies to an area. Because adult butterflies rely heavily on nectar as their primary food source.
- b. **Garden design**-wildflower gardens that include taller trees and shrubs behind shorter species can be aesthetically pleasing.
- c. **Create puddles**-providing a source of water in the form of shallow, lined depressions or puddles, small fish ponds, birdbaths or simply a sand-filled bowl buried in the ground will collect water to help attract butterflies to wildflower plantation (NRCS and WHC, 2000).

Besides other initiatives can be taken as follows: Encouraging native legumes dock, milkweed, nettle, and native grasses; Reducing pesticide and herbicide use in agricultural areas when possible (NRCS and WHC, 2000). Using mechanical means of pest control to minimize loss of nectar-producing trees, shrubs and flowers; Maintaining natural and planted grassland by conducting prescribed rotational burning; Restoring hydrology and vegetation in forested wetlands; Preserving existing trees, shrubs, vines, hedgerows, and wildflowers (NRCS and WHC, 2000).

B. Conservation & Mitigation Measures

- a. **Preserving large populations in large areas:** Large and diverse landscapes offering a large variety of microclimatic conditions can support larger and more stable butterfly populations and communities for a much longer time than small areas. Nature conservation not only protect existing areas, but also try to extend them and manage them to create large, diverse habitats with strong butterfly populations (Van Swaay, et al 2010).
- b. **Encouraging mobility across the landscape:** Barriers across the landscape preventing butterflies to shift their ranges in northern direction should be removed as far as possible (Van Swaay, et al 2010).
- c. **Gaining time to adapt:** Targeted management on the ground should offer existing populations the time to adapt and move to new areas (Van Swaay, et al 2010).
- d. **Reducing the emission of greenhouse gasses:** Only by a serious reduction in the emission of greenhouse gasses we can expect climate change to slow down, but that should not prevent us from doing what we can do to reduce this impact (Van Swaay, et al 2010).
- e. **Researching:** To understand what is happening in our continent and improve adaptation strategies in the future, research is a vital instrument (Van Swaay, et al 2010).
- f. **Monitoring:** Butterfly monitoring is spreading over the continent and more and more countries are with developing schemes. The schemes not only provide information on the effect of climate change on butterflies, but they also give direct information on biodiversity changes (Van Swaay, et al 2010).
- g. **Updating the indicator:** Only by regularly updating the indicator we can follow the change of butterfly communities and the impact of climate change on our butterflies (Van Swaay, et al 2010). For Butterfly conservation the term "Butterfly Park" can be a good and significant option for assortment of butterflies in an ecosystem. *Butterfly Park of Bangladesh* is the first and only tropical garden in Bangladesh with live Butterfly. It is one of the most pleasant places for families and visitors to enjoy. The natural beauty surrounded by Live Butterfly Zone, Butterfly Museum, Butterfly Rearing Room, Nursery, an abundance of flowers, artificial Lake, waterfalls etc. can be a sources of pleasure of visitors of all ages.

CONCLUSION

It is evident that the richness of butterfly species and families is dependent on the richness of plant species and family in a forest ecosystem. So, there is a deep association and this association is strategic and characteristic for the conservation of biodiversity not only for the plant and butterfly species richness but also for the wildlife in the forests. As this association is an indicator for understanding biodiversity status in a forest ecosystem, further studies in the field should be attempted. As butterflies have got reciprocal relations with the related plants, these plants are dependent on the butterflies for their pollination purposes and gene-flow activities. For this well presence of butterflies ensures the strong status of a forest ecosystem. Undeniably there are innumerable areas that need to be strengthened to get proper conservation and management of butterflies in Bangladesh. Conservation of butterflies will improve the whole environment for wildlife biodiversity and enrich the lives of people in present as well as in future.

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