



A Study On Swallowtail Butterflies In Taranagar Region During Monsoon Season (Order: Lepidoptera; Family: Papilionidae)

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Abstract- Butterflies, a beautiful creature of nature, belongs to the order Lepidoptera of the class Insecta of the phylum Arthropoda. These butterflies are very beautiful and charming which adds the beauty in our gardens and make the environment pleasant. Butterflies are the biggest contributors to the pollination of flowering plants and various important crops. Butterflies also act as indicators of environmental health. That is, they play an important role in our healthy ecosystem and as important link in the food chain. In this investigation, researchers studied the butterflies of the family Papilionidae during the monsoon season in the study area. Papilionidae is an important family of the order Lepidoptera which includes Swallowtail butterflies. The present study was done in Taranagar region of Churu district of Rajasthan, from July 2023 to October 2023. The environmental conditions in this region are very diverse and challenging. The temperature reaches near 50°C in summer and freezing point in winter season. The monsoon period is of four months from July to October with the moderate rainfall. During this work researchers listed some swallowtails butterflies like Lemon butterfly (*Papilio demoleus*), Common Mormon (*Papilio polytes*) and Common Rose (*Pachliopta aristolochiae*).

Keywords - Lepidoptera, Papilionidae, Butterfly, Swallowtails, Monsoon, Pollination, Food chain, Taranagar.

Introduction- Insects are unique organism and they classified into Class Insecta of Phylum Arthropoda in Animal Kingdom. Butterflies are very beautiful, attractive and common insects. Butterflies are classified in the order Lepidoptera of the Insecta class. Lepidoptera is an order of class Insecta that includes butterflies and moths and they are known as Lepidopterans. They are found in all types of habitat. Lepidopterans are found on almost all continents in a great diversity. It is one of the most worldwide distributed and widely recognizable insects order.

We can see butterflies flying in the garden or hovering on flowers. These are very beautiful flying insects. Butterflies are very attractive and colorful insects and are generally active during the day. As we know that butterflies are most active during the day, so many people watch butterflies for pleasure, joy or entertainment. Butterflies play an important role as natural pollinators in the ecosystem, so they have great importance in pollination.

Butterflies are large in size and their body is divided into three segments; head, thorax and abdomen. They have compound eyes, six legs and two pairs of colored wings with many different patterns. They also have a pair of club-shaped antennae. Lepidopterans are characterized by several specific features. The most apparent is the presence of scales which covers the whole body, wings and proboscis also. The scales on the wings are a special feature of butterflies. Their wings and legs are attached to the thorax laterally. Generally they have colorful wings with many patterns.

They carry piercing and sucking type of mouth parts, so, they suck the sap of flowers through a tube-like structure known as Proboscis. The Proboscis is a long flexible tongue. Mostly butterflies collect nectar from flowers, so butterflies keep hovering over the flowers. Taste receptors are found in the feet of butterflies which help in detecting the taste of food.

On the basis of metamorphosis, butterflies are the Holometabolous type of insects because they undergo complete metamorphosis. They have a very short life.

These are passes through four stages in their life cycle-

- Egg
- Larva (Caterpillar)
- Pupa
- Adult

Male butterflies release special chemicals called pheromones and perform courtship dances to attract females. If the female butterfly is interested, she mates with the male. The male butterfly dies after the mating process. Mating and egg laying is carried by adult near or on host plant. Their Larvae are commonly known as caterpillar. It is completely different from adult butterfly. Caterpillar has cylindrical shape of body with well developed head, biting and chewing type of mouth parts and three pairs of thoracic legs. Fully matured larva develops into pupa. Once the pupa completed its metamorphosis, a sexually mature adult emerges.

Order Lepidoptera contain many families of butterflies and moths. On the basis of morphological, ecological and behavioral characteristics butterflies are classified into many families and subfamilies. The diversity of the member of families of Lepidoptera order can be seen in different season according their favorable condition. Out of all, the members of family Papilionidae are found mostly in summer season, rainy season or monsoon season and some are found throughout the year. In this study, researchers studied the member of family Papilionidae found in the monsoon season. These members are also known as swallowtail butterflies. Swallowtail butterflies are medium to large in size and of bright colored pattern such as black, blues, green, yellow, etc. Their hind wings are extended as a tail like structure so that these are refers to as 'Swallowtails'. These are strong fliers. These show mimicry to toxic butterflies. The members of family Papilionidae are mostly feed on citrus plants. The present study was focused on the species of family Papilionidae found in the monsoon season in the study area.

Study area- Rajasthan, 'The Land of Kings' is the largest state of India. It covers about 10.4 percent of the total geographical area of India. The present study was done in Taranagar region of Churu district of Rajasthan. The summer season in this region is very challenging as the temperature reaches near 50°C whereas the winter season is short but even in the winter, temperature reaches the freezing point. In the beginning of July month the monsoon season comes with the moderate rainfall and the rainfall is continues till the month of October. Monsoon rains from July to October increase a rich mix of greenery and flowering in this area, which provides a suitable environment for butterflies, so their number is increases. For this study, data of butterflies was collected from government nursery of forest department located in urban area of Taranagar and three gardens of Maa Jalpa Devi Govt. College, Taranagar. These sites of the study area are known for their greenery in monsoon season that is favorable for butterfly's development.

Methodology- The following procedures and methods were used for data collection from selected sites in the study area:-

Selected Sites for Data Collection- The researchers first identified two main flowering sites to study the diversity of Swallowtails butterflies in the urban areas of Taranagar.

For this work, the Forest Department's Nursery was selected in the urban area where the environment is rich with flowers and greenery. The three gardens of Maa Jalpa Devi Government College, Taranagar located in

the urban area are also full of green environment where plants and flowers are in abundance. Hence the nursery campus and three gardens of the college campus were selected for this study. The study was conducted during the monsoon season from July 2023 to October 2023.

Methods - Several methods were used by the researchers to study the diversity of swallowtail butterflies. First of all, for this research work, researchers visited to selected sites of Taranagar region. Data for this study was mainly collected by using observational method. In addition to the observation method, the collection method was also used, but the collection at the mass level is avoided only one member of each variant was collected for identification purposes. Beside it, Field survey, mobile photography, community involvement methods were also used for this study.

Equipments- Various instruments were used during this study. The authors used a suitable insect net to capture the swallowtail butterflies. Collection bottles, boxes, entomological pins, wooden boxes, papers, spreading boards, forceps, hand lenses and cameras were the major tools used during the study. The photographs of swallowtail butterflies were also taken from the mobile.

Identification of Butterflies- The butterflies and their photographs collected from the selected sites were identified with the help of various identification keys books and subject experts.

Result and Discussion - Through this study, the authors were observed three types of swallowtail butterflies in selected sites of Taranagar region that are - Lemon Butterfly (*Papilio demoleus*), Common Mormon (*Papilio polytes*) and Common Rose (*Pachliopta aristolochiae*).

Swallowtail butterflies were observed in less numbers in this area. These observations were made during the monsoon season, which includes data from July 2023 to October 2023. The monsoon season of this region is a suitable environmental condition for these observed butterflies. Due to ecological factors like favorable temperature, high humidity, availability of food and mates, etc., these were able to complete their life cycle.

These butterflies observed during the study contain following general features-

Papilio demolius – This is known for their rapid range expansion. In monsoon season the number of this species is increases due to the flowering on plants mainly citrus plants, so it is also refers to as Lemon butterfly. This is the peak time for its breeding because it breeds in warm and much humid environment. In this season, the fresh leaves of citrus plants are favorable as food for caterpillars.

Papilio polytes – They commonly known as Common Mormon and has many types of females. Their male form has a yellow spot on the hind wing. These are fast fliers butterflies. These swallowtails are usually found close to the ground. These were found near the curry leaf tree and various species of Citrus (like lemon tree) during the study.

Pachliopta aristolochiae- This is commonly known as Common Rose swallowtail. This species was very rarely reported here in monsoon season. Black wings covers the red abdomen were considerably noticed during the collection. This was observed near the Hibiscus plant as it feeds on nectar.

Conclusion- The research work done in the monsoon season in two sites in the urban area of Taranagar reveals the diversity of swallowtails butterfly here. From these sites, researchers observed Lemon butterfly, Common Mormon, Common Rose butterflies during the monsoon season. This study concludes that the climatic conditions of this region during the monsoon season become favorable for the members of the Papilionidae family. Hence, this study shows the presence of members of the family Papilionidae in the study area. The reporting of this family in this desert region is a sign of a healthy environment.

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