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Biodiversity Of Butterflies In Beed District, Maharashtra, India

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Abstract: Butterflies are perhaps the most conspicuous and colourflul insects. Due to their attractiveness and omnipresence they have acquired a niche in the prose and poetry of various cultures. Therefore, they have made excellent subject for natural history observations and scientific studies. Butterflies are very useful to mankind because they help in pollinating the crop plants and other flowering plants. To accommodate an ever increasing population, man has ruthlessly exploited and destroyed Wildlife habitats. Loss, fragmentation or transformation of habitats have been mainly due to changes in use of land such as urbanization, industrialization, agricultural development, vegetation manipulation, shifting cultivation, introduction of exotics etc. Natural habitats such as forests, grassland, deserts, wetlands, mangroves, coral reefs etc. are under tremendous pressure due to increasing population densities and activities of human beings. Butterflies pollinate the crop plants grown worldwide for food, beverages, fibers, condiments, spices and medicines.

Keywords: Butterflies, Pollinaters, Papilionidae, Pieridae, Nymphalids

I. INTRODUCTION

The Butterflies belong to order Lepidoptera. It is one of the mega orders of class insect, which occure throughout the world in both warm and temperate climates .It is the largest order among the insects and is made up of about 1, 50,000 species so far known. The order Lepidoptera includes Butterflies and Moths of which about 17820 are Butterflies (Shields, 1989). Lepidoptera (Lepis = Scale, Pteron = Wing) are the only insects with wings covered by scales. They are day fliers. The tiny, loosely attached structures those give them their remarkable colors and patterns. Butterflies do not have a direct relation with water as the aquatic animals have. Some species like the peacock pansy seen near water bodies because their larval host plants grow profusely close to the water. Butterflies are perhaps the most conspicuous and colourflul insects. Due to their attractiveness and omnipresence they have acquired a niche in the prose and poetry of various cultures. Therefore, they have made excellent subject for natural history observations and scientific studies. Butterflies are very useful to mankind because they help in pollinating the crop plants and other flowering plants.

Zoogeographically, India is situated at the junction of oriental, Ethiopian and Palaearctic realms and these assemblages of three district realms made India unique and rich in biodiversity. India is located in South Asia between latitude 6° and 38° N and longitudes 69° and 97° E. India, with total geographic area of 3.29 million hectors is bounded by Himalaya in the North, the Bay of Bengal in the East, the Arabian Sea in the West and the Indian Ocean in the South. The climate ranges from temperate to arctic in the Himalaya, to tropical and subtropical in its Indogangetic plains and the peninsular region and vegetation cover includes all kinds of forest and vast expanse of grasslands.

To accommodate an ever increasing population, man has ruthlessly exploited and destroyed Wildlife habitats. Loss, fragmentation or transformation of habitats have been mainly due to changes in use of land such as urbanization, industrialization, agricultural development, vegetation manipulation, shifting cultivation, introduction of exotics etc. Natural habitats such as forests, grassland, deserts, wetlands, mangroves, coral reefs etc. are under tremendous pressure due to increasing population densities and activities of human beings. Wildlife habitats are getting destroyed at an alarming rate with disastrous effects on biodiversity. While a large number of species have become extinct in the recent past, the survival of many others is threatened. Thus, habitat loss is

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considered as major threat to biodiversity of Butterflies (World Resources, 1994-95).

Beed District is one of the 36 districts of Maharashtra state in western India. It is bordered by the districts of Ahmednagar to the west, Aurangabad and Jalna to the north, Parbhani to the North-East, and Latur to the East and Osmanabad to the South. The district covers an area of 10,693 km². It has semi-arid, hot and dry climate consisting mainly of three seasons summer are long ranging almost five months from mid February to June. Temperature in summer falls between 32°C to 40°C. However it may reach higher than 42°C. Winters are short with temperature ranging within 12°C to 20°C. Rain is scarce and occurs only during the monsoon from mid June to September. Annual average rainfall is 66.6 cm. July has the maximum rainy days. This district receives low rainfall because it is located in rain shadow area.

The relationship between pollinators and flowering plants is one of the most essential mutually beneficial relationships in the natural world. Animals pollinate the crop plants grown worldwide for food, beverages, fibers, condiments, spices and medicines. Pollinators are also required for the successful proliferation of native plant communities and Wildlife habitats. Pollinators are in decline due to the loss, modification and fragmentation of their habitats by human activities. The extensive use of pesticides which often kills pollinators; as well as pests and replacement of native vegetation and wild flowers with pasture grasses contribute to the pollinator decline.

II. MATERIAL AND METHODS

Studies on species diversity and distribution patterns of Butterflies from Beed District, as a part of present study was carried out during August 2015 to July 2017. The study area was fully explored and then probable areas were decided. Butterflies are seasonal in their occurrence. They are common for only a few months and rare or absent in others. To study the seasonal patterns/diversity in Butterfly abundance, the entire year was divided into three seasons. The three seasons of the year are pre-monsoon i.e. from February to May, monsoon i.e. from June to September and post-monsoon i.e. from October to January. From each study area (Tahsil / Taluka) five sites / biotopes were selected. Two waterfalls in the district are very famous i.e. Kapildhara Waterfalls is located just 6 km northwest of Narmadakund, Beed and Sautada Waterfall is located in the village of Sautada is the beautiful waterfall which is considered to be the biggest waterfall in Beed Distric. Both waterfalls area are covered in this study. The study area was visited twice in each season during the two years i.e. 2015-2016 and 2016-2017. In the said investigation the selected sites were surveyed mainly between 07.30hrs to 12.30hrs and butterflies were identified / captured for their systematic and diversity studies by adopting following material and methods:

MATERIAL

INSECT NET

Insect net was used for collection of Butterflies from the field. It contains aluminum handle, nearly 18 inch in length, having a circular metal ring 9 inch in diameter and collecting bag of 30 inch in depth made up of ordinary nylon mosquito netting cloth, which was attached to the metal ring.

INSECT BOXES

The standard insect boxes in varying sizes were used for preserving Butterflies. The insect boxes consist of basal wooden portion covered with soft wood for pinning the insects and upper side is perforated by glass; rests of the sides are made from wooden material.

Spreading Board

Spreading Board was used for pinning the Butterflies.

Oven

Oven was used for drying the insects.

Butter Paper Envelopes

Butter Paper Envelopes were found to be very convenient for storing the preserved Butterflies. The Butter paper envelopes in size 4" X 5" indicate information about name of field collector, place, locality, date and time of collection. These envelopes were kept in transparent plastic boxes along with naphthalene balls to protect preserved butterflies from ants.

Besides the above material, magnifying glass was used to observe the identification marks on upper and lower side of the fore wing and hind wing. Insect pins were used to pin the butterflies. Brushes were used for careful handling of the butterflies.

Camera

Nikon and Sony H 55 14 Megapixel

Global Positioning System (GPS) Instrument

GPS MAP 60 CSX

III. METHODS

BUTTERFLY SPECIES DIVERSITY

During field trips the Butterfly diversity was studied from each area with the help of following methods:

- ✓ Observation and identification,
- ✓ Photographs
- ✓ Capture and release method
- ✓ Collection and preservation method.

A. OBSERVATION AND IDENTIFICATION

During field visits, observations were done by walking in different areas e.g. fields, road side, gardens, streams, Ghats, grass land, hill side, forest, nursery gardens and public gardens. Approximately half to one km walk in one direction and different directions. Observations were made at a distance of a meter or two. Identification was made by observing morphological features. Unidentified species were

photographed and later identified with the help of identification keys.

B. PHOTOGRAPHIC EVIDENCES

Butterflies are active and immediately fly away with a little disturbance. It is difficult to catch them. So it is necessary to Collect and take photograph of butterfly. We found number of butterflies dead nearby shrubs, few were collected and used for photography. Photographs are taken with help of Nokia and Sony Camera. Photographic prints were examined carefully and were identified with the help of various field guides and pertinent literature.

C. CAPTURE AND RELEASE METHOD

Butterflies difficult to identify by visual observation so they were captured with the help of insect net carefully, transferred to plastic transparent box and then identified with the help of various field guides and available literature. On identification, Butterflies were released in the same environment.

D. COLLECTION AND PRESERVATION METHOD

Butterfly specimens were collected from study area with the help of insect collecting net. As a conservation policy, collection of Butterflies which are included in Schedule I, II and IV, was avoided. The collected few species were killed by using insect killing jar and further these species were pinned by insect pins using spreading board. The pinned insects were dried in oven at 60° Celsius. The dried Butterflies were kept in the insect boxes and butter paper envelopes.The preserved specimens were morphologically studied noting their size, shape and colour patches and markings on wings.

Photos and collected specimen were examined carefully. Identification, classification and nomenclature were done using available literature (Wynter Blyth-1957, Talbot-1975, Varshney-1979, 1983, 1985 and 1988), Gey et *al.*, 1992, Haribal-1992, Goankar-1996, Gunanthilagaraj et *al.*, 1998, Kunte-2000, Kehimkar-2008).

IV. RESULT AND DISCUSSION

Butterflies are studied as living ecological components. The 15 species of butterflies recorded in Beed district. A complete checklist of butterflies with their photographs is mentioned below.

Family Papilionidae, Pieridae and Nymphalids are recorded here also occur in South India (Larson, 1987).

About 105 species of swallotails (papilios) out of the world 700 are found in India among them 19 species are present in Penninsular India. 15 species have been reported from our study area, during our study period. In July to August the rainfall is more in these years. In these three months flowering shrubs are growing abundantly which is source of food for Butterflies. Due to favorable conditions like suitable temperature, humidity and rainfall the density of Butterflies are seen more in every study area. In November, December and later on the numbers of Butterflies are decline due to decrease the food sources. (See Climatic data)

FAMILY: PAPILIONIDAE

- ✓ *Common Rose – Atrophaneuraaristolochiae (Fab.):* It occurs commonly in open cultivated areas, scrub and deciduous forest. Slow but straight fluttering flight, usually not more than 3 to 4 m above the ground, but at times does fly higher seen throughout the year at different localities. Adult black, red bodied swollowtail, forewing very elongated and black on both sides with paler greyish stripes in distal part of cell and between veins. Both sides of tailed hind wings have a large white area made up of about five elongated spots around end cell, the lowest one near the body being pink-tinged and a series of deep red or brownish - red spots on outer margin, sexes are alike.
- ✓ *Comonmomon – Papilopolytes (Linnaeus):* It is very common males have fast flight while female fly slowly. Found of flowers males visit damo patches and dung. Male velvet black with a row of white spots. Margins of both sides of fore wing also have a series of smaller white spots. Female larger with three different forms form cyrus similar to male but red marginal crescent strongly marked on hind wing. Form romulus mimics
- ✓ *Lime Butterfly – Papiliodemoleus (*Linnaeus): It is very common among the swallowtails and also the most widely distributed it is common where lime and lemon tree grow. Hindwings is tailless. Adult tailers yellow-spotted, black butterfly. Both sides of forewing with broad irregular spots and patches. Marginal and terminal rows of yellow spots on both wings on upper side. Sexes are similar.
- ✓ *Yellow Helen - Papilionephelus (Boisduval)*: Found in February to October near flowers and damp area. They have large, black bodies and four creamy spots at the base of wings.

FAMILY: PIERIDAE - [WHITE AND YELLOW]

- ✓ *Common Grass Yellow – Euremahecabe* (Linnaeus): It is one of the most common among Indian butterflies.Visits flowers and damp patches. Migrate in large numbers eggs are taile singly. Make one bright yellow in colour upper forewing apex broadly black, upper hind wings with narrow black terminal border. Female similar with black borders.In both sexes rusty markings on both wings.
- ✓ *Common Emigrant – Catopsiilapomona* (Fab.): It is common species of garden and city areas. Seen on flowers in gardens through out the year. Hot days bring these butterflies to demo's patches. Flight rapid with reeatie up and down swoops. Both sexes are yellow to translucent greenish white antennae black or red marking highly variable.
- ✓ *White Orange Tip – Lxiasmarianne* (Cramer): It is common cames to flowers and occasionally to a damp patch on the wing mainly during and immediately after rains. Both sexes mainly white, apical half of upper wing black, enclosing a large orange patch. Upper hind wing has black terminal border orange patch on female has

narrow containing four black spots. It is found in hilly area. It is sun loving and occasionally found in dump area.

- ✓ *Large Cabbage White – Pierisbrassicae (Linnaeus)*: Commonly found in open spaces. It has strong flight. Majority found in October. Both sexes have black tipped UPF and pale yellow powered without markings. Male has two distal spots and in female spots are absent.

FAMILY: NYMPHALIDS

- ✓ *Common Evening Brown - Melanitisleda (Linnaeus):* It is common, flight jerky, close to the ground. Commonly found in various habitats except desert. Active at dusk and comes indoors attracted to light. During the day, prefers to remain in the under-growth. Two black eye spots at the apex. Portal to tree sap, covering fruit occasionally visits flowers, especially during early morning. Large brown upper forewing has dull dark brown with two prominent black eye spots.
- ✓ *Great Eggfly – Hypolimnasbolina (Linnaeus)*: It is common in forest area and seen in the gardens. It is widely distributed throughout the plains, but more common just after the rains. Sexes are different in pattern. Male on upper black with a white centered, iridescent blue oval spot on each wing Female an excellent mimic of the crow butterflies.
- ✓ *JokerBybliailithyia (Drury):* Commonly found in dry, open area, grass area. Flight is very weak. Male having narrow black markings. Female is dark brown. Black colour is outer band and black colour is between.
- ✓ *Plain Tiger Danauschrysippus (Linnaeus)*: Common in every region of Beed district. Flight is close to ground. Both sexes pale orange with black marginal borders. At the tip white band of elongated spots which is similar to stripted tiger but without bold outlines to veins and three to four small black discal spots on both side.
- ✓ *Stripted Tiger Danausgenutia (Cramer)*: Found in variety of habitat. From forest to scrub and open area. Male has bold black veins. Upper end wing margins with small white spots along border and broadly black apex.
- ✓ *Common Leopard Phalantaphalantha (Drury)*: Very active butterfly and found in forest, plains and gardens. Male have small black spots and way lines. Prominent black spot between veins. Female has larger markings.
- ✓ *Glassy Tiger Paranticaaglea (Stoll)*: Found in open, agricultural land. The flight is weak and slow near the ground. Both sexes with bluish white markings on wings.

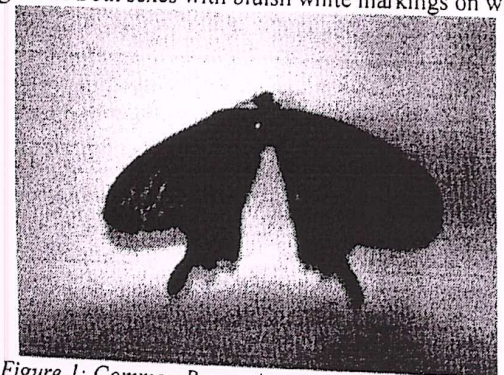

Figure 1: Common Rose - Atrophaneura aristolochiae

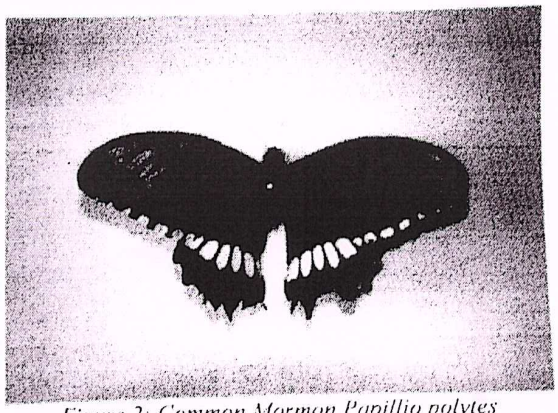

Figure 2: Common Mormon Papillio polytes

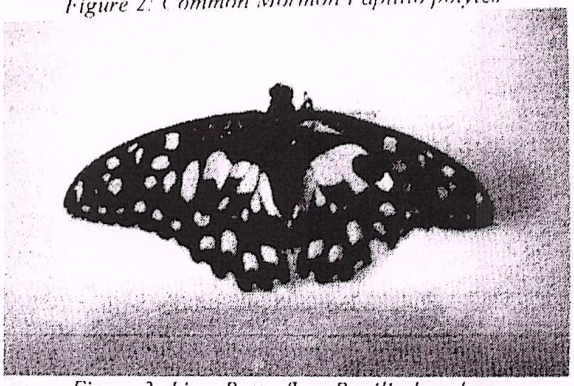

Figure 3: Lime Butterfly – Papiliodemoleus

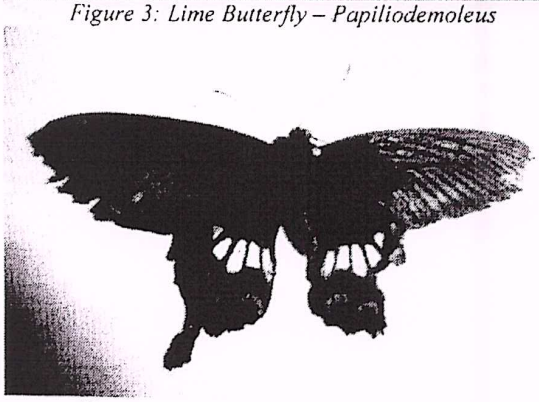

Figure 4: Yellow Helen - Papilio nephelus

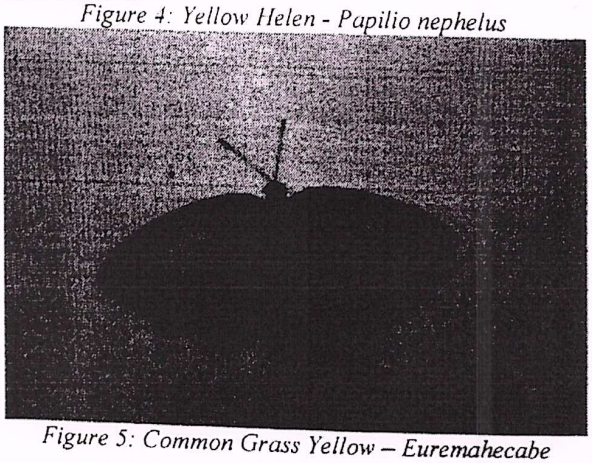

Figure 5: Common Grass Yellow – Euremahecabe

Figure 6: Common Emigrant – Catopsilia Pomona

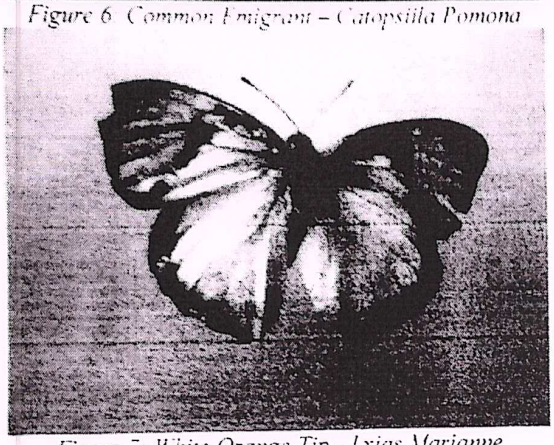

Figure 7: White Orange Tip - Ixias Marianne

Figure 8: Large Cabbage White – Pieris brassicae

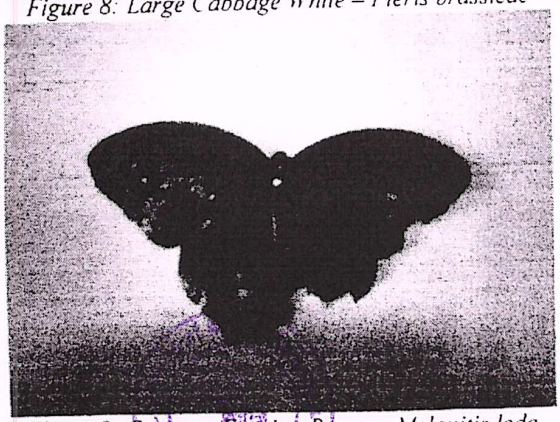

Figure 9: Common Evening Brown - Melanitis leda

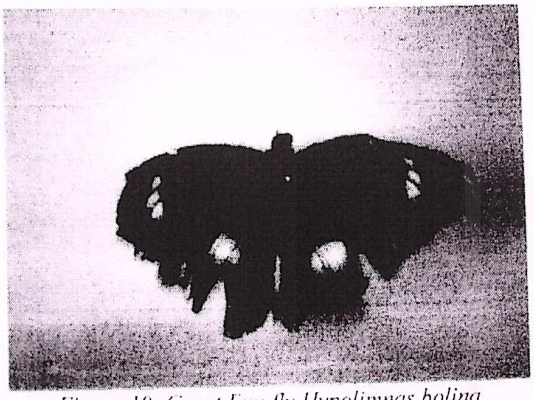

Figure 10: Great Egg fly Hypolimnas bolina

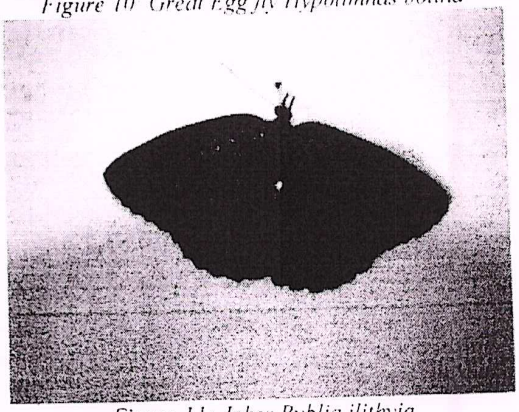

Figure 11: Joker Byblia ilithyia

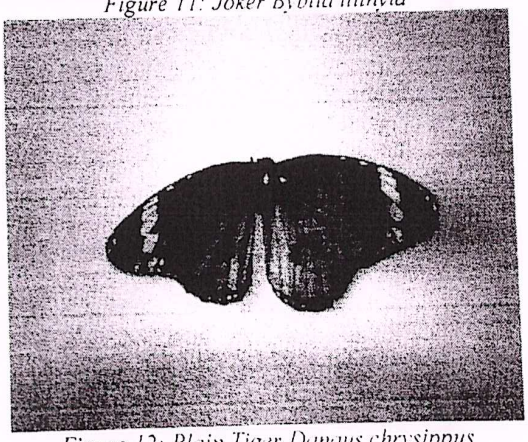

Figure 12: Plain Tiger Danaus chrysippus

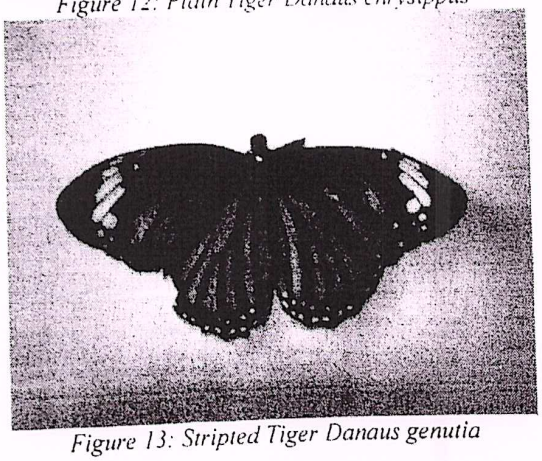

Figure 13: Striped Tiger Danaus genutia

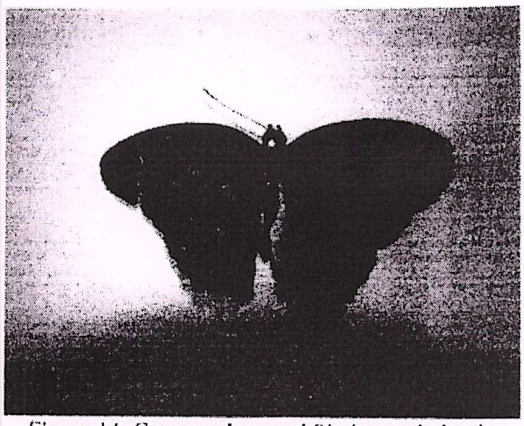

Figure 14: Common Leopard Phalanta phalantha

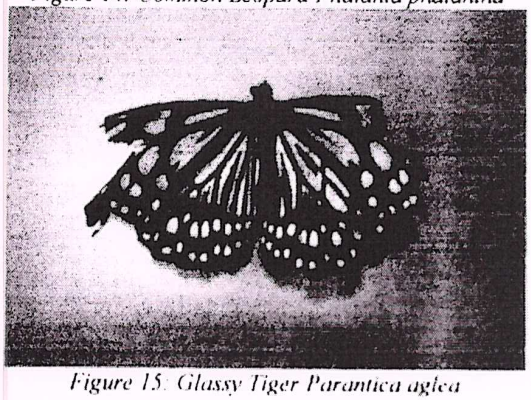

Figure 15: Glassy Tiger Parantica aglea

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