

DOCUMENTATION OF BUTTERFLIES (PAPILIONOIDEA) OF TANDOJAM

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ABSTRACT: Butterflies during present study Papilionoid butterflies were collected from various localities of Tandojam. During the course of identification of Papilionoidea group 07 species were discovered under two families. Nymphalidae with two subfamilies and two tribes, subfamily Danianae and tribe Danaini with two species *Danaus chrysippus* (Linnaeus, 1758) and *Euploea core* (Cramer, 1780); tribe Junoniini with one species *Junonia almana* (Linnaeus, 1758), subfamily Nymphalinae and tribe Nymphalini with one species *Aglais kaschmirensis* (Kollar, 1848). Family Papilionidae and subfamily Papilioninae with three species and two tribes; two species under tribe Papilionini, *Papilio demoleus* (Linnaeus, 1758) and *Pachliopta aristolochiae* (Fabricius, 1775), lastly tribe Leptocircini with one species record *Graphium sarpedon* (Linnaeus, 1758).

Key words: Butterflies Tandojam, Papilio, Danainae.

INTRODUCTION

Over discoveries on the planet earth 1.4 million species of living organisms are found out of which 53% are insects, and in worldwide 15,000 to 16,000 are the species of butterflies [8]. Order Lepidoptera is widely distributed and also widely recognized insect order in world [21]. The term Lepidoptera was first used by Linnaeus in 1735 which is derived from Greek language and it means scale and wing. In *Systema naturae* 1758 Linnaeus indicated three divisions of order Lepidoptera viz; *Sphinx*, *Phalaena* and *Papilio*, and seven subdivisions in *Phalaena*, which poses nine super families of order Lepidoptera. [3] Estimated that from 126 families and 46 sub families 174,250 species of this order are recorded. According to body structure order Lepidoptera shows huge difference by which they have to gain various lifestyles and distribution. Recent estimation indicates that order Lepidoptera have more species than the earlier estimations among three other most specious orders like Coleoptera, Hymenoptera and Diptera [17].

Both moths and butterflies come in order Lepidoptera and they are also called Lepidopterans. It is clearly said that butterflies are dispersed worldwide including Antarctica where 18,500 species of order Lepidoptera are found out of which 775, 7,700, 1,575 and 3,650 species are related to Nearctic, Neotropical, Palearctic and Afrotropical regions. Where, 4,800 are dispersed thoroughly in Australian and Oriental regions [27]. Elsewhere [10 11]. It was reported that in Pakistan more than 5,000 species of insects are reported from them 400 species are of moths and butterflies. Butterflies are regarded as the symbol of beauty and grace [19]. Commonly butterflies are best known creature because of their diurnal habitats and readily recognized by their bright colors, marvelous shapes and graceful flight give pleasure to everyone [9].

Since 250 years, classification of butterflies and skippers is based on the morphology of adult specimens [9]. The usefulness of characters from immature stages has long been acknowledged but they have only recently been automatically incorporated in a phylogenetic context [16, 7]. Study of these features remains severely hampered by the lack of detailed descriptions or preserved specimens of larvae and pupae from which characters may be discerned. Since long time butterflies and skippers have been described in two super-families and five families; where Hesperidae (skippers) are included in super-family Hesperioidea however, butterflies

(Lycaenidae, Nympheroidea, Pieridae and Papilionidae) are compiled into Papilionoidea. There is some differences in the morphology of different groups and within the families [26]. Superfamily Papilionoidea consists of Pieridae (Whities and allies), Lycaenidae (Blues, coppers, hairstreaks), Papilionidae (Swallowtails), Riodinidae (Metalmarks), Hesperidae (Skippers), Nymphalidae (Brush-footed or four-footed butterflies).

In family Papilionidae swallowtails butterflies are colorful and large in numbers including 550 species. Species of the family Papilionidae are tropical they can survive everywhere except Antarctica [20]. Swallowtail butterflies have different morphological characters viz; the repugnatorial organ which is present in papilionid caterpillar is called osmeterium bears on its prothorax. Normally osmeterium remnants unseen but while vulnerable the caterpillar turns it outward by an oblique dorsal groove by inflating it with fluid [23]. Butterflies are the most typical insects which are present in magnificent patterns of bloom, notable simulation, metamorphic birth, dietetic performance and demise. Adults of the butterflies and their caterpillars feed on definite host plant for foliar pollens and nectar for their diet. Hence butterflies multiplicity shows all over multiplicity of plants, especially the herbs and shrubs of the area where they inter-relate as herbivorous and pollinators [13].

Scientists have worked out on various aspects viz; biology, distribution and multiplicity of butterfly fauna in Pakistan. First time work on butterfly fauna from Kashmir was carried out by [4]. From Karachi and its adjoining areas work on butterfly fauna was carried out by [25]. In [14], authors conducted first time work on butterfly fauna from India and its adjoining areas. [24] Reported distribution pattern of butterfly from Pakistan. Different habitats of butterflies in Chitral were reported by [13]. Fauna of butterflies from various localities of Pakistan, Barma and India were reported by [22, 18]. From Baluchistan fauna of butterfly was reported by Evans [6]. Many authors explored butterfly fauna of British-India from many regions [2, 12, 5, 6] in which some regions of Pakistan were included.

From Tandojam no work has been carried out on superfamily Papilionoidea, present study will be helpful to understand the biodiversity of this group and that may help in the management strategies.

MATERIALS AND METHODS

Place of work: For present study Papilionoid butterflies were collected from various localities of Tandojam and some museum specimens were also determined. Further examination and identification was carried out at the Insect Systematic Laboratory, Department of Entomology, Sindh Agriculture University Tandojam.

Method of Collection: Collection was made through traditional hand net from various localities. Museum specimens collected from various parts of Sindh are also included here.

Methods of Killing and preserving: Butterflies were killed in a jar containing potassium cyanide and mounted through entomological pins. Specimens were labeled containing the information about the locality and date of collection, the name of the collector, and the host plant, if known, and were pinned beneath the specimen, the sample for labeling is given below.

Method of imaging: For habitus' (adult) images the high pixel camera was used, and for the images of genitalia; 350 k pixel, USB camera fitted on microscopes a) Labomed CSM2 (20X and 40X),

b) Kyowa Medilux 20 were used.

Methods of identification: To identify the specimen up to the species level, keys for the region were collected from various publications.

RESULTS AND DISCUSSION

In present study total 55 members of the superfamily Papilionoidea were studied. During the course of identification of Papilionoidea group 07 species were discovered under two families. Nymphalidae with two subfamilies and two tribes, subfamily Danianae and tribe Danaini with two species *Danaus chrysippus* (Linnaeus, 1758) and *Euploea core* (Cramer, 1780); tribe Junoniini with one species *Junonia almana* (Linnaeus, 1758), subfamily Nymphalinae and tribe Nymphalini with one species *Aglais kaschmirensis* (Kollar, 1848). Family Papilionidae and subfamily Papilioninae with three species and two tribes; two species under tribe Papilionini, *Papilio demoleus* (Linnaeus, 1758) and *Pachliopta aristolochiae* (Fabricius, 1775), lastly tribe Leptocircini with one species record *Graphium sarpedon* (Linnaeus, 1758).

Lepidoptera, Linnaeus, 1758

Papilionoidea, Latreille, 1802

Nymphalidae, Rafinesque, 1815

Danainae, Boisduval 1833

Danaini, Boisduval, 1833

Danaus chrysippus (Linnaeus, 1758) (Plate 1a)

Description: This butterfly is commonly known as akk butterfly, plain tiger or African monarch, they are generally brown in appearance with white markings at apical part of forewing, both forewings and hindwings have fringe of dark brown with small uneven spots, mid of hindwing with three spots. Size range from 7 to 8 centimeters. Males have scent gland in the form of special pouch on hindwing with white in appearance, having slight border, it is used to attract females. Material examined. Pakistan: several ♂, ♀, Sindh Prov., Tandojam.

Euploea core (Cramer, 1780) (Plate 1b)

Description: It is commonly called as common crow, size ranges between 3.3 to 3.7 inches, general appearance is dark brown, row of oval elongated markings start at the outer margin of forewing, markings become more elongate while moving towards the inner margin of hindwing. Due to bad taste, it is avoided by many predators, thus many butterflies mimic them.

Material examined. Pakistan: 1 ♀, Sindh Prov., Tandojam.

Nymphalinae, Swainson, 1827

Junoniini, Reuter, 1896

Junonia almana (Linnaeus, 1758)

(Plate 1c)

Description: They are commonly known as peacock pansy and are commonly found in Pakistan. Forewing is yellow ochraceous with black wavy bands on the upper margin, double wavy line run along the margin of forewing and hindwing. One round black spot at the lower side of forewing with small white spot in center. Hindwing with spot like peacock feather in appearance, outer circle black, inside half black and half brown with prominent white spot in center. Underside of the wings spots tending to increase or decrease greatly by weather conditions.

Material examined. Pakistan: 1 ♂, Sindh Prov., Tandojam, 17.vii.2015.

Nymphalini, Rafinesque, 1815

Aglais kaschmirensis (Kollar, 1848) (Plate 1d)

Description: It is commonly known as Tortoise shell, it is commonly found in Indian Subcontinent. General appearance is Tiger like, background colour brownish with high and blurred patches, big black markings on forewings, outer margin of forewing and hindwing brown and black parallel strip. Hindwings with basal half dusky brown, posteriorly covered with long brown hairs.

Material examined. Pakistan: 1, Sindh Prov., Tandojam, 12.vi.2015.

Papilioninae Latreille, 1802

Papilionini, Latreille, 1802

Papilio demoleus (Linnaeus, 1758)

(Plate 1e)

Description: It is commonly known as lemon butterfly, citrus butterfly or citrus swallowtail, though it does not have tail like other swallowtail butterflies, its larvae attack on citrus gardens and is considered as invasive pest. Broad oval and irregular yellow bands are present near thorax, they become smaller in size as they progress towards the edge of forewing and hindwing. Some blue spots at proximal portion of forewing can be seen. The base colour is black in appearance.

Material examined. Pakistan: several ♂, ♀, Sindh Prov.

Pachliopta aristolochiae (Fabricius, 1775)

(Plate 1f)

Description: They are commonly known as black swallowtail butterfly, forewings, generally they are black in appearance, forewings are completely black with light yellow streaks making a thin band on upper side. Hindwing with oval and elongated 5-6 white bands, in the month June, July these markings become smaller in size. Red Crescent shaped markings covering the edge of hindwing.

Material examined. Pakistan: several ♂, ♀, Sindh Prov.

Leptocircini, Kirby, 189

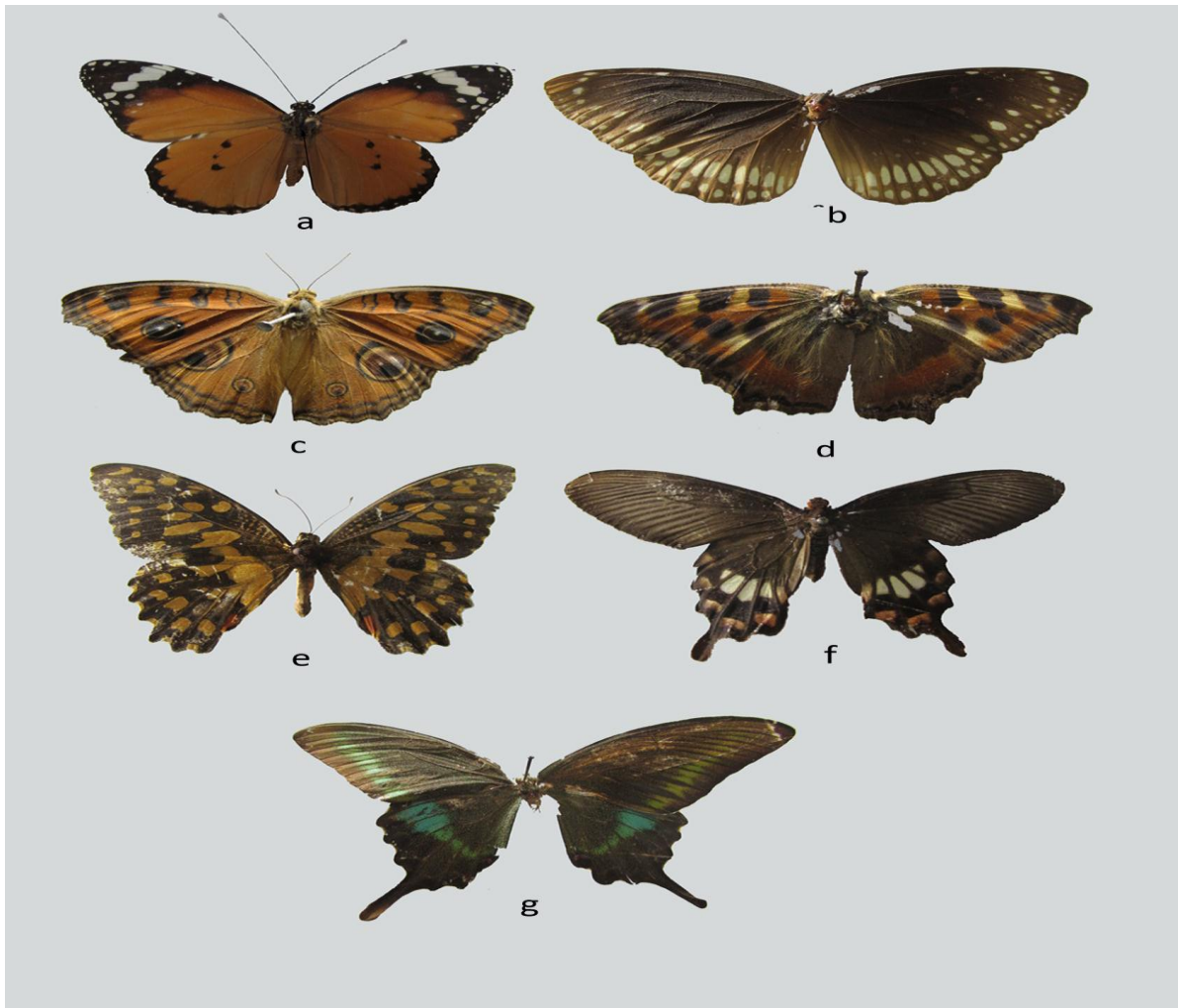


Plate 1. a) *Danaus chrysippus* b) *Euploea core* c) *Junonia almana* d) *Aglais kaschmirensis* e) *Papilio demoleus* f) *Pachliopta aristolochiae* g) *Graphium sarpedon*.

Graphium sarpedon (Linnaeus, 1758) (Plate 1g)

Description: It is commonly known as bluebottle, though it is distributed in Indian Subcontinent, but this is a very rare species of swallowtail group in Tandojam. Various subspecies are known to occur in various geographical regions. Base colour of forewings metallic brown with streaks making a thin band. Forewing with the pale blue medial band, much thicker in hindwing, become thin while moving towards the inner margin of hindwing. Abdomen is missing. Wing span of 55-75 mm.

Material examined. Pakistan: 1, Sindh Prov., Tandojam.

Three families of butterflies can be easily distinguished from each other, as Nymphalidae have predominantly orange or pale brown colours, reduced forelegs, large, prominent knobs at the tips of their antennae; Papilionidae are diurnal and heliophilous (sun loving), medium to large in size; Pieridae are predominantly white, creamy, yellow or light orange colours and are predominantly black or dark colours. With distinct spots underside and upper side of wings. From old world *Papilio demoleus* is recognized with 6 species including; *demoleus*, *libanius* Fruhstorfer, *malayanus* Wallace, *novoguineensis* Rothschild, *sthenelus* Macleay and *stenelinus* Rothschild. *P. demoleus* is similar to the African

species *P. demodocus* Esper from which it can be distinguished by the characteristic form of the blue and red eyespots on the hindwing as well as the rounded outlines of cream spots on the forewing. *Euploea core* (Cramer, 1780) during larval stage they sequester toxins from their host plant which is transferred from larva to adult. This species is distasteful, it has a habit of resting at single food source, hence it gives more time to pollination.

During the course of study it was felt that, special attention is required for understanding biodiversity of butterflies in our region, since the morphology of butterfly is greatly influenced by various factors, hence their biology, ecology, may also be studied, which will help us to understand butterflies, and being agriculturist we must promote conservation of butterflies.

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