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Diversity of pierid butterflies (Lepidoptera: Pieridae) in Jamshoro district, Sindh, Pakistan

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Abstract

The present study was carried out during January to December, 2013, in Jamshoro district of Sindh Province, Pakistan. During study period, 655 specimens of Pierid butterflies were collected with the help of insect net and hand picking from the different localities of Jamshoro district. Among these specimens, ten species of Pierid butterflies belonging to four genera (*Anapheis*, *Catopsila*, *Colotis* and *Eurema*) of two subfamilies (Pierinae and Coliadinae) were identified. This is the first record of Pierid butterflies from Jamshoro, Sindh, Pakistan.

Keywords: Diversity, Characteristics, Pierid butterflies, Jamshoro, Sindh, Pakistan.

1. Introduction

Pierid butterflies belong to family Pieridae of order Lepidoptera. This group of butterflies is distributed worldwide. Most Pierid butterflies are white, yellow or orange in coloration, often with black spots. The pigments that give the distinct colouring to these butterflies are derived from waste products in the body and are a characteristic of this family [1]. Adults of Pierid butterflies are pollinators, but larvae or caterpillars are serious pest of many crops and fruits. Caterpillars of most Pierid butterflies feed on various varieties of mustards (family Brassicaceae), legume and cabbage [2]. Entomologists have worked on different aspects such as biology, distribution and diversity of butterfly fauna from Pakistan. Doherty first time worked on the diversity of butterflies from Kashmir [3]. After that, Swin how worked on the taxonomy of butterfly fauna from Karachi and its adjoining areas [4]. Marshal and de-Niceville worked on the diversity of butterfly fauna of the Indian sub-continent [5]. T.J Robert worked the taxonomy of butterflies from different localities of the Pakistan [6]. Previously, many scholars worked on the butterfly fauna from different localities of Pakistan [7]. Very little research carried out from Sindh, Pakistan, especially Jamshoro district was untouched regarding butterfly fauna. Therefore, this study is an enormous source of information of Pierid butterflies from Jamshoro, Sindh, Pakistan.

2. Materials and Methods

2.1 Study Site

District Jamshoro is situated on the right bank of river Indus. This district consists of four Talukas, which are Sehwan, Manjhand, Kotri and Thano Bola Khan. It is Located at 25°25'36" N latitude and 68°16'47" E longitude with an elevation of 13 metres (42 ft). The total geographical area of the district is 11,517-Km². Most of the area of Jamshoro is cultivated remaining part is hilly. The climate of this district is pleasant. In summer, the northern part (Sehwan) is hotter than other parts of the district and cool in winter.

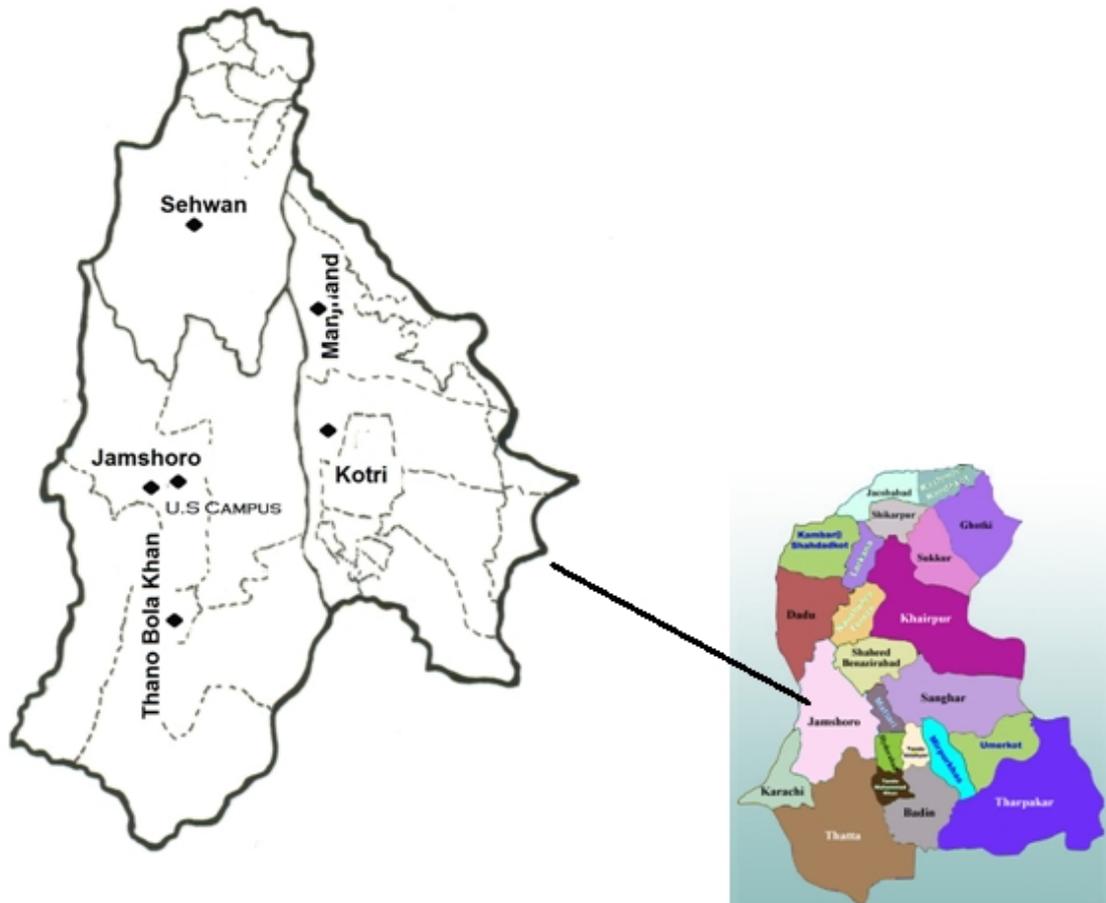
2.2 Collection and Preservation

The specimens of Pierid butterflies were collected with the help of insect net and hand picking during January to December, 2013, from different localities of Jamshoro, such as Sehwan, Manjhand, Kotri, Thano Bola Khan and Sindh University Campus. The collected specimens were killed with chloroform, stretched on stretching board, then transfer to the insect boxes. Identification was done on the basis of literature [8, 9] and keys [10, 11]. Identified species of Pierid butterflies were labeled properly.

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Map of District Jamshoro depicting the sampling sites

3. Results

During study period, a total 655 specimens were collected. Among these specimens, ten species of Pierid butterflies belonging to four genera of two subfamilies were identified.

Order: Lepidoptera

Super order: Rhopalocera

Super family: Papilionoidea

Family: Pieridae

Subfamily: Pierinae

Genus: *Anapheis*

Anapheis Aurota F. (Figure 1A & 1B)

Anapheis aurota (Fabricius, 1793) commonly called Pioneer. Medium sized butterfly Head black with white hair, eyes dark-brown with light black spots, antennae black, maxillary palpi yellowish-white with white scales, proboscis light yellow; thorax black with white hair, fore wings white, costal black streak from the base continuing and widening along the discal cell curved toward the lower apex of the cell, apical and terminal area black with white pointed spots, hind wings white, lower side veins bordered with black, apical and terminal area black; abdomen black.

Subfamily: Coliadinae

Genus: *Catopsila*

Catopsila Florella F. (Figure 1C & 1D)

Catopsila florella (Fabricius, 1775) commonly called African Migrant. Head black, eyes light red, eyes brown, maxillary palpi whitish yellow, proboscis black, covered with white hair; thorax black, covered with white hair, fore wings, yellowish white, costal and apical margin brown, termen with irregular brown spot, one black spots on discoidal cell, hind wings, yellowish white, terminal margin brown; abdomen brown covered with yellowish white scales.

Catopsila Pomona F. (Figure 2A & 2B)

Catopsila Pomona (Fabricius, 1775) commonly called Emigrants. Head round, eyes large, antennae slender, without scales, maxillary palpi well developed, third segment small, proboscis large, highly coiled; thorax black covered with light yellow scales, fore wings, white, base yellowish, apical margin black, hind wings, white, base yellowish, legs white; abdomen brown covered with light yellow scales.

Catopsila Pyranthe L. (Figure 2C & 2D)

Catopsila pyranthe (Linnaeus, 1758) commonly called Mottled Emigrant, medium sized butterflies. head black covered with white hair, eyes brown, antennae black, maxillary palpi white, proboscis black; thorax black, covered with white hair, fore wings, ground colour white, costa, apex and termen black, hind wings, ground colour white, legs white, abdomen black, covered with white scales.

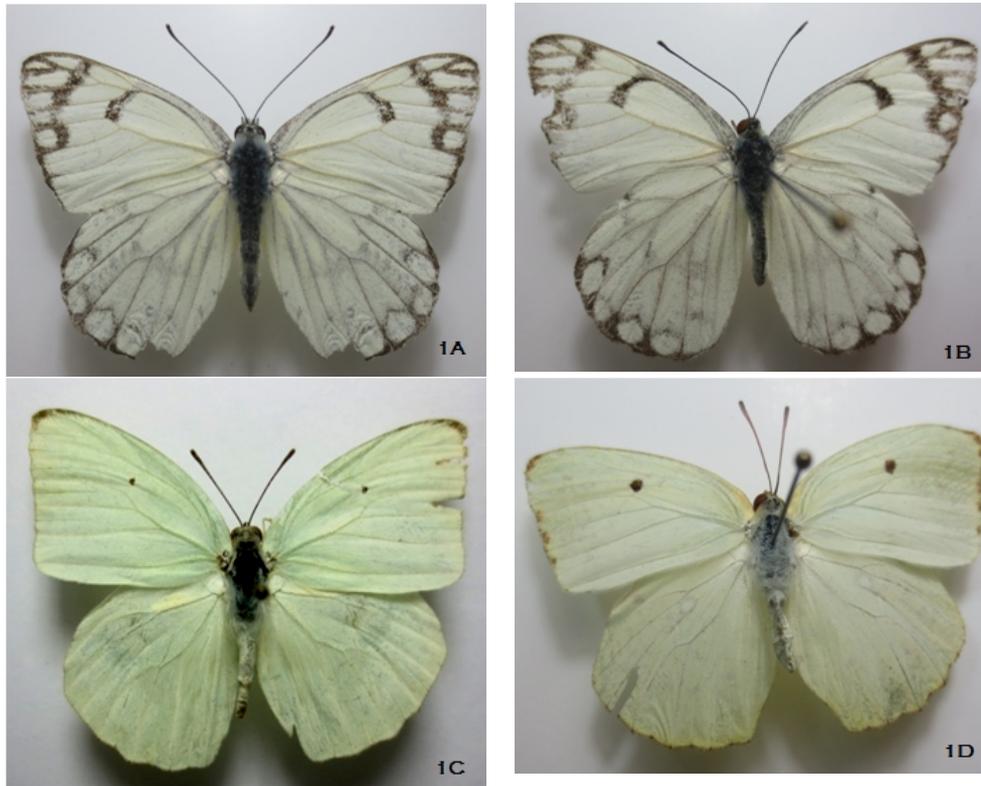


Fig 1: (A) *Anapheis aurota* (Male); (B) *Anapheis aurota* (Female); (C) *Catopsila florella* (Male); (D) *Catopsila florella* (Female)



Fig 2: (A) *Catopsilia pomona* (Male); (B) *Catopsilia pomona* (Female); (C) *Catopsilia pyranthe* (Male); (D) *Catopsilia pyranthe* (Female)

Genus: *Colotis*

***Colotis amata* F.** (Figure 3A & 3B)

Colotis amata (Fabricius, 1775) commonly called Small Salmon Arab. Head white, covered with greenish fuscous hair, eyes light yellow, antennae white, maxillary greenish; thorax white, covered with greenish fuscous hair, fore wings, salmon pink, costa black, covered with pinkish scales, apex and termen broadly black with transverse series of pink spots, hind wings, salmon pink, costa apex and termen broadly black with pink spots, abdomen white.

***Colotis danae* F.** (Figure 3C & 3D)

Colotis danae (Fabricius, 1775) commonly called Crimson Tip. This species mostly found in Asia and Africa. Head black, clothed with brown, sometimes grayish-black, eyes black, antennae pale brown, maxillary palpi white, thorax black, covered with grayish-black hair, fore wings, ground colour white, base irrorated with black, apex carmine, bordered with black, termen black, hind wings, ground colour with base irrorated with black, terminal black spots, abdomen white.

***Colotis protractus* B.** (Figure 4A & 4B)

Colotis protractus (Butler, 1876) commonly called Blue Spot Arab. Previously it was recorded from Punjab, Baluchistan and Khyber Pakhtunkhwa and is recorded first time from Jamshoro, Sindh. Head black, eyes dark brown, antennae brownish black, spotted with white scales, maxillary palpi pale yellow; thorax black with white hair at the side, fore wings, ground colour salmon-pink, base bluish grey spots, hind wings, ground colour salmon-pink, costa and dorsum white, apex and terminal margin broadly black, bluish grey scales

from base to the terminal margin; abdomen, back.

***Colotis etrida* B.** (Figure 4C & 4D)

Colotis vestalis (Boisduval, 1836) commonly called Small Orange-Tip. Head black, eyes grayish brown, antennae black, maxillary palpi white; thorax black with white hair, fore wings, white, base irrorated with black scales, a black spot in the discal cell, apically oblique orange spots border with black, hind wings, white, terminal black spots; abdomen black with white scales.

***Colotis Vestalis* B.** (Figure 5A & 5B)

Colotis vestalis (Butler, 1876) commonly called White Arab. Head black, eyes dark brown, antennae white, maxillary palpi white; thorax black, fore wings, ground colour white, costal base irrorated with dusky-grey scales, apex and termen broadly black with white spots, hind wings, ground colour white, apex and termen broadly black; abdomen black.

Genus: *Eurema*

***Eurema Hecabe* M.** (Figure 5C & 5D)

Eurema hecabe (Moore, 1881) commonly called Grass Yellow. Head black covered with yellow scales, eyes brown, antennae dark brown with white scales, palpi yellow, proboscis light brown; thorax, dorsal side black covered with sparse yellow hair and scales, ventral side black densely covered with yellow scales; legs yellow, fore wings yellow, black marking under side costa, apex, termen and tornus dark black, hind wings yellow black marking under side, apex and terminal margin dark black; abdomen, abdomen black covered with yellow scales.



Fig 3: (A) *Colotis amata* (Male); (B) *Colotis amata* (Female); (C) *Colotis danae* (Male); (D) *Colotis danae* (Female)



Fig 4: (A) *Colotis etrida* (Male); (B) *Colotis etrida* (Female); (C) *Colotis protractus* (Male); (D) *Colotis protractus* (Female)



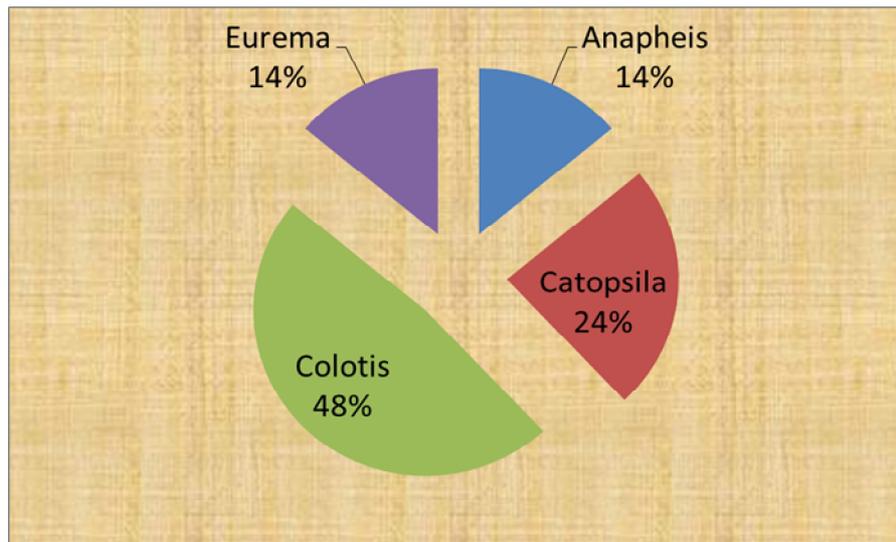
Fig 5: (A) *Colotis vestalis* (Male); (B) *Colotis vestalis* (Female); (C) *Eurema hecabe* (Male); (D) *Eurema hecabe* (Female)

Table 1: The number of butterflies species collected from six localities of Jamshoro district during the study period

S. No	Species	Jamshoro	Kotri	T. Bola khan	Sehwan	Manjhand	S.U Campus	Total
01	<i>Anapheis Aurota</i>	15	14	12	21	13	15	90
02	<i>Catopsila florella</i>	13	04	14	11	05	12	59
03	<i>Catopsila pomona</i>	09	12	10	06	14	10	61
04	<i>Catopsila pyranthe</i>	06	10	01	08	02	09	36
05	<i>Colotis amata</i>	14	09	14	13	10	08	68
06	<i>Colotis danae</i>	05	00	02	09	06	05	27
07	<i>Colotis etrida</i>	17	13	14	08	03	14	69
08	<i>Colotis protractus</i>	10	03	13	12	10	16	64
09	<i>Colotis vestalis</i>	16	13	19	14	11	14	87
10	<i>Eurema hecabe</i>	24	14	21	10	13	12	94
11	Total	129	92	120	112	87	115	655

Table 2: Total number and Percentage of four genera collected from the six localities of Jamshoro district during study period

S. No	Name of genera	Jamshoro	Kotri	T. Bola khan	Sehwan	Manjhand	S.U Campus	Total + (%)
01	<i>Anapheis</i>	15	14	12	21	13	15	90 (14%)
02	<i>Catopsila</i>	28	26	25	25	21	31	156 (24%)
03	<i>Colotis</i>	62	38	62	56	40	57	315 (48%)
04	<i>Eurema</i>	24	14	21	10	13	12	94 (14%)

**Fig 6:** Showing the genera wise distribution of Pierid butterflies from Jamshoro district during the study period.

4. Discussion

Butterfly fauna has been explored by many scholars from different provinces of Pakistan. Ahsan and Iqbal surveyed butterfly fauna of Lahore from different localities [12, 13]. Fitzherbert explained the diversity and the distribution of butterflies, 90 species were recorded between Gilgit and Khunjerab at high altitude [14]. Khan reported 20 species from Mirpur, 19 species from Bhimber and 16 species from Kotli. A total 450 specimens were collected, of which 36 belonging to 25 genera and 8 families were identified [15]. Parveen explored 21 species belonging to 3 families namely Nymphalidae, Papilionidae and Pieridae from Kohat (Khyber Pakhtunkhwa), Pakistan, [16].

During study period, ten species of Pierid butterfly were identified, which are belonging to four genera and two subfamilies. The genus *Colotis* were recorded highest number

(48%) including five species followed by *Catopsila* (24%) including three species and Genus *Eurema* and *Anapheis* (14%) including one species respectively (Table No.2 and Figure 6). The present study was the first attempt to explore of Pierid butterflies from Jamshoro, Sindh, Pakistan. This is a new addition in an existing literature in the World.

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