Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 38, Heft 5: 69-88 ISSN 0250-4413 Ansfelden, 2. Januar 2017

Characteristics of family Nymphalidae (Lepidoptera) in Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan

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Abstract

The butterflies are good indicators of environment changing, colorful wings, symbol of appealing creatures. The present study were carried out at Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014-May 2015. The specimens were collected with the help of insect net. A total of 248 specimens were collected of family Nymphalidae with their species are: Plain tiger, *Danauas chrysippus* Linnaeus; Blue Tiger, *Tirumala limniace* Cramer; Peacock pansy, *Junonia almana* Linnaeus; Indian fritillary, *Argynnis hyperbius* Linnaeus; Indian red admiral, *Vanesa indica* Herbst; Yellow pansy, *Junonia hierta* Fabricius; Blue pansy, *Junonia orytha* Linnaeus; White edged rock brown, *Hipparchia parisatis* Kollar; Banded treebrwon, *Lethe confuse* Aurivillius; Common Castor, *Ariadne merione* Cramer; Painted lady, *Cynthia carduii* Linnaeus; Himalayan sailer, *Neptis mahendra* Moore; Common boran, *Euthalia garuda* Hewitson. The aims of the present study to educate the local population of the community.

Key words: Nymphalidae, Junonia, Danauas, *Cynthia*, Common.

Zusammenfassung

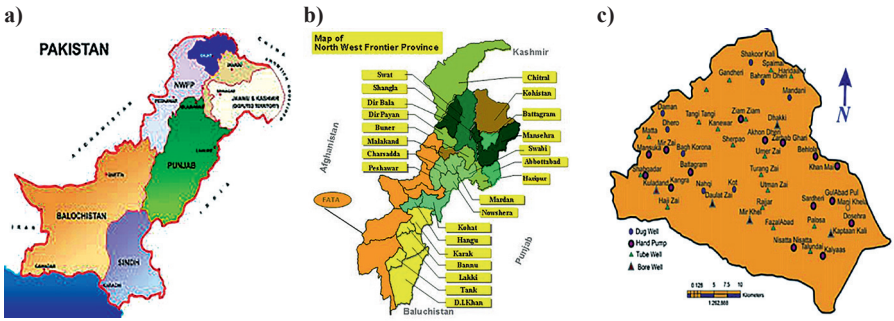
Schmetterlinge sind gute Indikatoren für Umweltveränderungen, zudem, mit ihren leuchtenden Flügeln, Inbegriff schöner Geschöpfe. Die vorliegende Studie wurde in Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan ausgeführt, im Zeitraum von August 2014 bis Mai 2015. Die Proben wurden mithilfe eines Insektennetzes gesammelt: Insgesamt 248 Tiere der Familie Nymphalidae mit folgenden Arten: Kleiner Monarch, *Danauas chrysippus* Linnaeus; Blue Tiger, *Tirumala limniace* Cramer; Peacock pansy, *Junonia almana* Linnaeus; Indian fritillary, *Argynnis hyperbius* Linnaeus; Indischer Admiral, *Vanesa indica* Herbst; Yellow pansy, *Junonia hierta* Fabricius; Blue pansy, *Junonia orytha* Linnaeus; White edged rock brown, *Hipparchia parisatis* Kollar; Banded treebrwon, *Lethe confuse* Aurivillius; Common Castor, *Ariadne merione* Cramer; Painted lady, *Cynthia carduii* Linnaeus; Himalayan sailer, *Neptis mahendra* Moore und Common boran, *Euthalia garuda* Hewitson. Ziel der Studie war es, die örtliche Bevölkerung zu bilden.

Introduction

The Tehsil Tangi is situated in the District Charsadda, Khyber Pakhtunkhwa (KP), Pakistan. Moreover, according to census report of 2000, more than 1.7 million people were live in Charsadda. Therefore, total area are 996 km^2, in addition, Pushkalavati was the first name of district Charsadda, which mean 'Lotus City', because they famous for lotus roots, *Nelumbo nucifera*, known as barsanday. Although, at that time the administrative centre of Gandhara kingdom is Pushkalavati. Additionally, in Charsadda there are 3 rivers: the Jindi, Kabul and Swat are main source of irrigation for it. Therefore, they were join and merge to the Indus River at Attock (Provincial boundary of Punjab and Khyber Pakhtunkhwa). Additionally, Doaaba is the area where they surrounded by River Kabul and River Swat, which play great and astatic role in the District. Although, River Swat merges with Kabul at Shahbara near to District Peshawar, and Kabul River merges with River Indus at Attack (Haroon et al. 2013) (Table 1).

The word Lepidoptera mean scaly wings, this word were first time devised by Linnaeus in 1735. However, they can found all over the world with spiritual and dynamic structure, recognized insects order of the biodiversity (Bhambhania & Vaghela 2014). Butterflies belong to class Insecta, Order Lepidoptera. Which means scale-winged are beneficial as pollinators, silk producers, indicators of environmental quality, and respected for their visual value (Haroon et al. 2013). They are well-known and most extensive insects order of among arthropods, where they can easily identified and mounted. Moreover, according to their spectacular shape, marvelous colour, mobile body and mostly elegant flight, where they acknowledged due to their diurnal habitats and willingly documented. Additionally, they are advantageous insects as environmental indicator, beneficial pollinator and having the excessive appealing and profitmaking principles (Khan & Perveen 2015). Therefore, they undergo complete metamorphosis and four different life stages like, egg, larva, pupa (depend on host plant), and adult (help in pollination) (Daniels et al. 2014). Actually, butterflies are considered as good indicator, to give health and food for terrestrial territory, where they occupy the major part of the ecosystem functioning.

Their larvae spoilage the host plant and destroy it for food feeding. However, the adult butterflies were sucking the juice of flower producing for nourishment (Tiple et al. 2006). They are providing the best rapid indicators of habit quality (Patil & Shende 2014).



Map 1: Map of Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan, in which the present survey on butterfly fauna was conducted during August 2014-May 2015: **a)** map of Pakistan; b) map of Khyber Pakhtunkhwa; c) map of Charsadda showing Tehsil Tangi with the 8 quadrates of the study area (Online, 2015)

Material and Methods

Study area: The present study were conducted at 8 quadrats of Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014-May 2015.

Materials: For the collection of butterflies following instruments and chemicals were used. Arial mesh, chloroform bottle, digital camera and insect's pins, setting boards, insect boxes, naphthalene balls, ruler and field book.

Butterflies collection and preservation: The specimens was escorted on locations subject by the most representative vegetation types of the region and agriculture land for cultivation of vegetables and fruits. To collect the species and explore their diversity, use a three meter long handed sweep net having 1 meter long net cloth and 1 foot width or volume. Collection was restricted for those species which could not be identified. The collected specimens were brought from the insects collection nets. The collected live species were killed by pinching transversely their thorax by charming appropriate taking keep all parts of the specimens or placed them in to cotton soaked chloroform bottles for short time of period to kill them. After killing the butterflies the collected were subjected for preservation. The specimens were pinned by entomological pins according to their size of specimens their body parts were stretched

and set their forewing on 180˚ with help of thermopile setting board in laboratory. The preserve specimens were properly subjected for their scientific name, common name and date of collection. After 2 days on draying their parts and stretched, the specimens were accurately labelled and mounted in the collection boxes. Finally the Naphthalene balls were placed in the boxes to keep the specimens safe from the pests.

Butterflies identification: The butterflies were identified with the help of keys, and available literature. Help was also taken by already identified specimens placed in National Insect Museum, (NARC) Islamabad by Muhammad Athar Rafi, Director National Insect Museum Islamabad, Pakistan. All the identified specimens were deposited in the National History Museum (NHM) of Department of Zoology Shaheed Benazir Bhutto, University Main Campus Sheringal, Dir Upper, Pakhtunkhwa, Pakistan.

Storage: The identified specimens was stored partly deposited National History Museum (NHM) of Department of Zoology Shaheed Benazir Bhutto, University Main Campus Sheringal, Dir Upper, Pakhtunkhwa, Pakistan and partly in the National Insect Museum (NIM), National Agricultural Research Centre (NARC), Islamabad, Pakistan.

The rank lists were prepared from each locality according to the maximum abundance with the help of which the diversity indices calculated and the collective rank lists along with the lists of the taxa from whole Tehsil were also prepared.

Morphological study: Identified specimens were subjected for measurement of their total body length and wing span, body length, antennae and legs length with the help of graph paper and ruler.

Photography: After the identification and measurement of specimens, they were placed one by one on top of a light blue paper. Photographs were taken on ventral side as well as by dorsal side by using digital camera, Yashica (14.2 megapixels), made in China.

Results

The present study was carried out in Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014 -May 2015. A total of 248 species were collected belong to 10 genera and 12 species.

Table 1: The morphometric measurement of species of family Nymphalidae collected from Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014-May 2015.

SNo	Species Name	BL*	WS*	Antennae	Legs
		M±SD (mm)*			
1	*Danauas chrysippus*	16.5±1.7	71.1±4.9	13.9±2.0	14.1±0.1
2	*Junonia orytha*	14.7±0.8	41.7±1.5	10.9±0.7	10.7±0.8
3	*Hipparchia parisatis*	18.0±2.7	64.3±4.2	11.7±1.5	11.3±1.2
4	*Argynnis hyperbius*	23.0±1.0	70.7±5.1	13.3±1.2	11.7±0.6
5	*Junonia almana*	16.0±1.0	46±1.73	8.67±0.58	6.67±0.58
6	*Ariadne merione*	15.6±0.7	48.1±2.2	10.3±0.5	8.4±0.5
7	*Tirumala limniace*	25.0±3.6	68.7±1.7	14.0±1.7	12.3±1.2
8	*Lethe confuse*	15.5±0.7	51.o±2.8	12.0±0.0	11.5±0.7
9	*Neptis mahendra*	15.5±0.7	50.5±3.5	12.0±0.0	11.5±0.7
10	*Vanesa indica*	14.5±0.7	50.5±0.7	14.0±1.4	11.5±0.7
11	*Junonia hierta*	16.0±0.0	42.0±0.0	12.0±0.0	11.0±0.0
12	*Euthalia garuda*	15.0±0.0	67.0±0.0	18.0±0.0	14.0±0.0

*BL: Body Length; WS: Wing Span; M: Mean; SD: Standard Deviation; n: number of specimens collected and measured; n_{tl}: total number of butterfly species; data were analyzed by Computer Program Microsoft Excel (CPME) 2013

1. Plain tiger, *Danauas chrysippus*

Morphological characters: The plain tiger, *Danauas chrysippus* Linnaeus, 1758; is large size butterfly having body length is 16.5±1.7 (mm), wing span 71.1±4.9 (mm), antennae 13.9±2.0 (mm) and legs 14.1±0.1 (mm) respectively (Table 1). The colour of the body of these species were mostly ground in colour. Therefore, the body colour structure is tawny, the brighter side indicate upper side, while the dim side show underside of the butterfly. The upper side margins of forewings having black and white spots. Additionally, the hindwings contain three black spots, having the thin borders, which encircling a series semicircular white spots. Therefore, the colour of the male tiger is brighter than female, while the size of female is larger than male.

2. Blue pansy, *Junonia orytha*

Morphological characters: The blue pansy, *Junonia orytha* Linnaeus, 1758; is medium size butterfly having body length is 14.7±0.8 (mm), wing span 41.7±1.5 (mm), antennae 10.9±0.7 (mm) and legs 10.7±0.8 (mm) respectively (Table 1). Therefore, both sexes are very similar in colour, more than half forewing are silky gloomy, while the apical half cloudy fuliginous. Additionally, the forewings were mainly comprise three dusky bordered, extensive, carroty sloping crews on the underside of the species. Moreover, on the upper side of hindwings two inflamed chocolate dusky ringed ocelli and shining blue are present. While in the female there were cloudy blue areas were present near to ocelli are obviously. Mostly, underside of the forewings a slim gloomy paired lines are present. However, the underside of the hindwings are pale grayish buffy pigments, while the chocolate bands are almost superseded.

3. Peacock pansy, *Junonia almana*

Morphological characters: The peacock pansy, *Junonia almana* Linnaeus, 1758; is medium size butterfly having body length is 16.0±1.0 (mm), wing span 46±1.73 (mm), antennae 8.67±0.58 (mm) and legs 6.67±0.58 (mm) respectively (Table 1). Furthermore, the upper side rich carroty creamy, forewings with a light greyish, costal boundary, terminal line dusky black, and white center ocellus gloomy costa, while hindwing having an insignificant carefully snowy addressed gloomy ringed, discal ocellus. The head, abdomen, thorax are slightly darker in colour, while the antennae are gloomier chocolate in colour. Therefore, both of the sexes were similar.

Figure 1: The plain tiger, *Danauas chrysippus* Linnaeus, 1758; was collected for determination of biodiversity of Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 2: The blue pansy, *Junonia orytha* Linnaeus, 1758; was collected for determination of Biodiversity of Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014- May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 3: The peacock pansy, *Junonia almana* Linnaeus, 1758 was collected for determination of Biodiversity of Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014 to May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

4. Common boran, *Euthalia garuda*

Morphological characters: The common boran, *Euthalia garuda* Hewitson, 1874; is large size butterfly having body length is 15.0±0.0 (mm), wing span 67.0±0.0 (mm), antennae 18.0±0.0 (mm) and legs 14.0±0.0 (mm) respectively (Table 1). Additionally, they have dark brown with slight traces of olive, at base some black short transverse lines present, one loop were present at across the central region, while another were present at elsewhere apex of the cell, underside of wings were minimum covered by gloomy and white spot. Therefore, head, thorax, abdomen and antennae were dusky black brown, moreover, antennae were corpulent at the tip (no hocks), while all body were found inflamed and underside mostly lighter brown.

5. Common castor, *Ariadne merione*

Morphological characters: The common castor, *Ariadne merione* Cramer, 1777; is large size butterfly having body length is 15.6±0.7 (mm), wing span 48.1±2.2 (mm), antennae 10.3±0.5 (mm) and legs 8.4±0.5 (mm) respectively (Table 1). Therefore, the termini of forewings are marginally bowl-shaped with tetragonal censored at apex. Moreover, underside were richly greenish chocolate with their gloomy brown slender bands were sighted during investigation. However, hindwings and forewings were aligned by the gloomy lines and rusty brown colour start from the margins of wings to their base point which lies near to abdomens. Bothe of the species were similar in sighted, while male is distinguish by a triangular dusky covering of trace scales at the underside of the forewings.

6. White edged rock brown, *Hipparchia parisatis*

Morphological characters: The white edged rock brown, *Hipparchia parisatis* Kollar, 1849; is large size butterfly having body length is 15.6±0.7 (mm), wing span 48.1±2.2 (mm), antennae 10.3±0.5 (mm) and legs 8.4±0.5 (mm) respectively (Table 1). Additionally, both wings were prominent a boarding snowy outer boarder encircle, where at the hindwings its cover more space then forewings. While the dorsal side of the respective species were dusky gloomy brown in colour. Furthermore, hindwing and forewing having three spots, however, tornal area of hindwings were also dusky black pupilled ocellus, while the underside having larger ocelli. Bothe of the sexes were very similar to each other, by size and colour.

Figure 4: The Common boran, *Euthalia garuda* Hewitson, 1874; was collected for determination of Biodiversity of Tehsil Tangi, Khyber Pakhtunkhwa, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 5: The common castor, *Ariadne merione* Cramer, 1777, was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014 to May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 6: The white edged rock brown, *Hipparchia parisatis* Kollar, 1849; was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014 to May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

7. Yellow pansy, *Junonia hierta*

Morphological characters: The yellow pansy, *Junonia hierta* Fabricius, 1798; is large size butterfly having body length is 16.0±0.0 (mm), wing span 42.0±0.0 (mm), antennae 12.0±0.0 (mm) and legs 11.0±0.0 (mm) respectively (Table 1). This a beautiful butterfly, having yellow colour. Therefore, the hindwings were sighted during investigation is mostly darkish creamy (yellow). While the forewings were reported at the time of investigation are lightly yellow. The male is brighter than female, both of the wings cilia are bleached swapped with brown in colour. However, at the base of the forewings dusky blue spots were sighted which covered a large surface area from blackish scales. Moreover, the head, thorax and abdomen are gloomy brownish dusky, where the antennae colour is watery (white). The male much brighter than female which having dull colour.

8. Banded tree brown, *Lethe confuse*

Morphological characters: The banded tree brown, *Lethe confuse* Aurivillius, 1897; is large size butterfly having body length is 15.5±0.7 (mm), wing span 51.0±2.8 (mm), antennae 12.0±0.0 (mm) and legs 11.5±0.7 (mm) respectively (Table 1). This butterfly were ground in colour, from 4 vein the hindwings are slanting crossed the forewings. Where at the tip of both hindwings small spots were present to distinguish forewings and hindwings from each other. Moreover, underside of hindwings three spots were present, while the underside of the forewings a large spot black and white in colour were sighted, with apexes. Additionally, 6 spots were present at both of forewings, in which 2 spots were black while other 4 of each are ground darkish. The head, thorax and abdomen were cloudy brown, antennae are club in shape.

9. Indian fritillary, *Argynnis hyperbius*

Morphological characters: The Indian fritillary, *Argynnis hyperbius* Linnaeus, 1763; is large size butterfly having body length is 23.0±1.0 (mm), wing span 70.7±5.1 (mm), antennae 13.3±1.2 (mm) and legs 11.7±0.6 (mm) respectively (Table 1). However, they exposes of male and female are very dissimilar; the female, with a snowy crew sloping the forewing peak and indigo crews dorsal side snowy expanse. While, male and female are orangey red on the superior apparent with distributed dusky acnes, through a gloomy indigo boundary to the hindwings margin charted with double obscure twisted lines, while sub marginal ring with black spots. The hindwing dorsally buff and broken bands of emerald green.

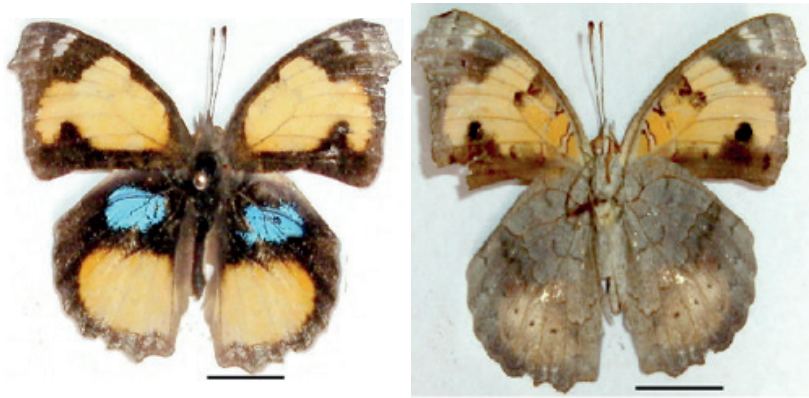


Figure 7: The yellow pansy, *Junonia hierta* Fabricius, 1798; was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014 to May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

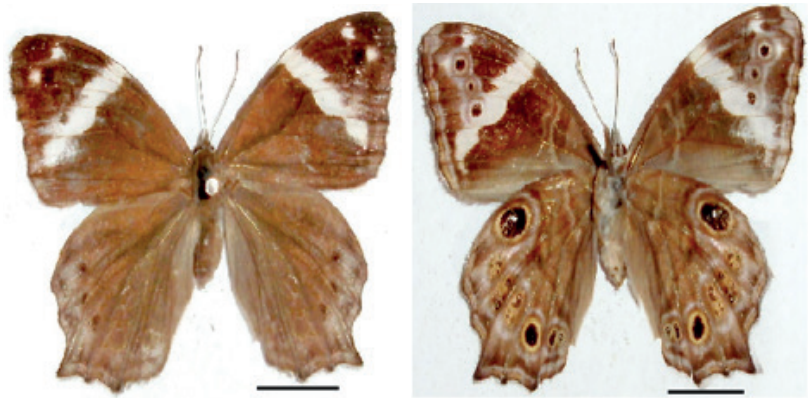


Figure 8: The banded tree brown, *Lethe confuse* Aurivillius, 1897; was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014 to May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 9: The Indian fritillary, *Argynnis hyperbius* Linnaeus, 1763 (♂), was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

10. Blue tiger *Tirumala limniace*

Morphological characters: The blue tiger, *Tirumala limniace* Cramer, 1775; is large size butterfly having body length is 25.0±3.6 (mm), wing span 68.7±1.7 (mm), antennae 14.0±1.7 (mm) and legs 12.3±1.2 (mm) respectively (Table 1). Although, the hind wing and fore wing consist of white bluish with semi hyaline spots and streaks. Both of the wings upper black in color while under side are dusky black. The veins of the wings are consist of bluish snowy quantity of distributed incapable sub terminal and terminal spots. Therefore, forewings of underside at the basal part two third veins were black gloomy, where the hindwings are brown olive. Therefore, all appendages (head, thorax, abdomen and antennae) of the *Tirumala limniace* is dark black.

11. Painted lady *Cynthia carduii*

Morphological characters: The painted lady *Cynthia carduii* Linnaeus, 1758; is a medium size butterfly having body length is 15.0±1.7 (mm), wing span 50.3±5.0 (mm), antennae 14.0±1.7 (mm) and legs 11.3±1.2 (mm) respectively (Table 1). Moreover, they having dusky and pinkish enflamed spots. Furthermore, at the apical region of forewings half of the area were covered by black gloomy and white spots. Therefore, the golden area where the black and white spots were present on discal and median regions. The hindwings having dense brownish in colour with black spots on carroty discal area and termen. However, both of the sexes were similar in structure, while the freshly emerged species are orange colour which were latterly change to tawny. The head, thorax and abdomen were brown black in colour.

12. Himalayan sailer, *Neptis mahendra*

Morphological characters: The Himalayan sailer, *Neptis mahendra* Moore, 1872; is a medium size butterfly having body length is 15.5±0.7 (mm), wing span 50.5±3.5 (mm), antennae 12.0±0.0 (mm) and legs 11.5±0.7 (mm) respectively (Table 1). Furthermore, wings of this butterfly were mostly erect and easily break. The colour of these species are dark brown, having white spot on their wings. Therefore, some spots of forewings and hindwings elongate and some spots are reduced which are cover most part of the wings. Additionally, underside of hindwings and forewings are obviously yellow brown in colour. They have the slimmer, compressed and elongated abdomen, where the legs of the specimens were reduced. As compare to other species they have long antennae and at the end they were club shape. Head, thorax and abdomen were brownish dark.

Figure 10: The Indian fritillary, *Argynnis hyperbius* Linnaeus, 1763 (♀), was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 11: The blue tiger *Tirumala limniace* Cramer, 1775; was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

Figure 12: The painted lady *Cynthia carduii* Linnaeus, 1758; was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

13. Indian red admiral *Vanessa indica*

Morphological characters: The Indian red admiral, *Vanessa indica* Herbst, 1794; is a medium size butterfly having body length is 14.5±0.7 (mm), wing span 50.5±0.7 (mm), antennae 14.0±1.4 (mm) and legs 11.5±0.7 (mm) respectively (Table 1). However, the colour of this butterflies are dark and dark red. Where three regular and one apex white spot were present on dorsal side of the hindwings. Furthermore, hindwings are much darker than forewings. Underside of the hindwings are lighter dark as compare to forewings, having dark spots at base, while silver colour were present at the tip of margins. Forewings mostly covered by brown colour, follow by dark red colour at the end of margins. Therefore, forewings having small black spots in many in number. Underside of the forewings is mostly silver in colour, where some spot of black colour were also present. However, head thorax and abdomen were also brown dark and olive in colour. The antennae is club in shape, which white at the tip and hocks. This is not a reported species as a pest of craps, but it damages the younger shots and leafs, and also effect the growth of the plant in younger stage.

Discussions

Different scientists work on distribution and documentation of butterflies in KP, Pakistan. Shah et al. (2001) first time explore the butterfly fauna of Kohat and reported 10 species belong to only family Pieridae from 7 different localities. During the present research, family Nymphalidae were recorded from Tehsil Tangi, which shows the great difference in both areas.

Naz et al. (2001) analyzed the diversity of butterfly fauna of Buner, KP, Pakistan and reported a total of 450 specimens were collected and identified, however, all specimens were belong to family Pieridae. While, in the present study, the most of specimens were belong to family Nymphalidae. However, there was the greatest difference in both areas. Furthermore, the Buner was a hilly and Tehsil Tangi was a plain area.

Perveen & Ahmad (2012) reconnoiter the butterfly fauna of Kohat and reported a total of 21 species belong to 3 families. However, from Kohat and Tehsil Tangi reported the same families but the percentage of the families were different in both areas because of the climatic conditions and vegetation.

Haroon et al. (2013) conducted a survey for identification and distribution of butterflies in Union Council Koaz Bahram Dheri, KP, Pakistan and collected 232 specimens from 12 localities. Moreover, the identified specimens of butterflies were belong to 13 species, 11 genera and 3 families. Family Nymphalidae comprised the largest number of butterflies 49% followed by Pieridae 37% and 14% of Papilionidae. However the similar families were reported from the present research, family Nymphalidae covered 49.8%. Although, both of the study areas having the same type of cultivation land, climatic condition and flora.

Perveen (2012) reported a total of 21 species belong to 3 families and 6 sub families from Kohat, KP, Pakistan. Additionally, 2 subfamilies of Nymphalidae: Nymphalinae covered 28% and Satyrinae 5% species. Furthermore, family Pieridae including 3 subfamilies,

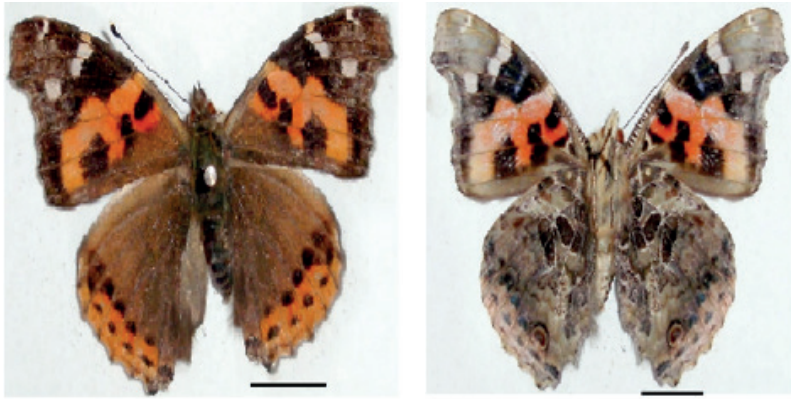


Figure 13: The Indian red admiral *Vanessa indica* Herbst, 1794; was collected for determination of biodiversity of Tehsil Tangi, KP, Pakistan during August 2014-May 2015; ventral side (a) and dorsal side (b); bar on the photographs indicate 10 mm

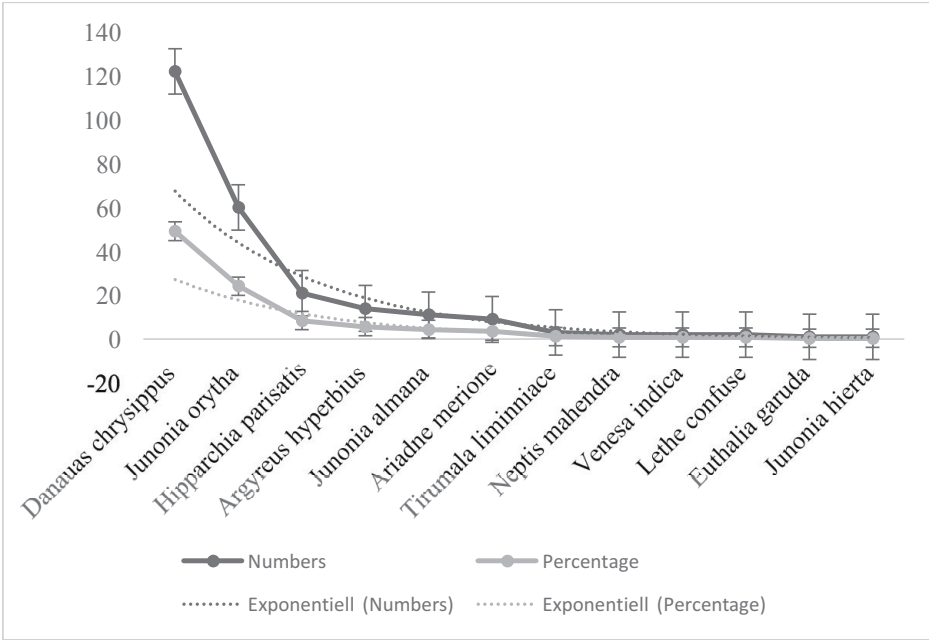


Figure 14: collected species of family Nymphalidae with their abundance from Tehsil Tangi, KP, Pakistan during August 2014-May 2015.

viz., Pierinae covered 24%, Coliaclinae 5% and Coliadinae 28%. While the family Papilionidae including only one subfamily, Papilioninae covered 10% species. However, at the present, reported 3 families; Nymphalidae and their subfamilies are: Danainae 25%; Nymphalinae 6%; Vespidae 12%; Satyrinae 4%; Biblidinae 2%; Trogidae 1 % and Limenitidinae 1%. Moreover, the Tehsil Tangi flora and fauna is mostly dominant as compared to Kohat due to large amount of agriculture land.

Perveen and Khan (2013) reported 170 specimens from Kabal, Swat belonging to 10 genera and 3 families. However, both study areas are very dissimilar to each other, because the climatic condition of Kabal, Swat is mostly cold, while in the Tehsil Tangi have moderate and warm condition.

Perveen and Fazal (2013) reported the butterfly fauna of Hazara University during 2013 and collected 170 specimens, however, % of collected specimens from each 3 quadrants was in descending order: Residential area: 53% > main campus: 34% > administration area: 12%. The collected specimens are belonging to 3 families 8 genera and 10 species. The reported families covers collected specimens in descending order; Pieridae: 5 > Nymphalidae: 3 > Papilionidae: 2. However, from the present study, species were collected from 8 quadrates, these are as follows: Union Council Koaz Bahram Dheri: 29% > Mandani: 14% > Ghandheri: 12% > Dhaki: 11% = Hisara Nehri: 11% > Harichand: 10% > Tangi: 7% and Shodagh: 6%. The weather condition of Hazara University was cold and hilly, while Tehsil Tangi was a plain and warm area, which were suitable environment for butterflies.

Khan et al. (2014) explored the butterfly fauna of Poonch Division of Azad Kashmir. Although, he collected butterflies from 28 different localities. Additionally, the localities visited were ten from district Bagh, ten from district Poonch and eight from district Sudhnoti. Therefore, a total of 32 species belonging to 3 families (5 Sub-Families), under 15 genera were identified from 28 localities. Out of these 32 species, 27 species in district Bagh, 28 species in district Poonch and 19 species in district Sudhnoti were identified. However, from the present research a total of 8 localities were visited and collected family; Nymphalidae and their subfamilies are: Danainae 25%; Nymphalinae 6%; Vespidae 12%; Satyrinae 4%; Biblidinae 2%; Trogidae 1 % and Limenitidinae 1%. Additionally, from the Tehsil Tangi flora and fauna is rich as compared to Poonch Division of Azad Kashmir due to large amount of agriculture land.

Khan and Perveen (2015) explore the family Nymphalidae fauna in Union Council Koaz Bahram Dheri. Furthermore, they were collected 130 specimens belong to 7 species and 6 genera. Moreover, the maximum specimens are *Danauas chrysippus* 72/130 (55.38%), followed by *Catopsilia pyranthe* 16/130 (12.31%), *Junonia orytha* 15/130 (11.54%), *Cynthia cardui* 11/130 (8.46%) and minimum specimens are *Junonia almana* 5/130 (3.85%) and *Phalanta phalantha* 3/130 (2.31%). The most abundant species are: plain tiger, *Danaua chrysippus* 122 (24.1%). Moreover, the flora and fauna of Union Council Koaz Bahram Dheri and Tehsil Tangi are very similar due to temperate and climatic conditions.

Conclusion

From the present study were conducted on the characteristics of butterfly fauna of family Nymphalidae at Tehsil Tangi, KP, Pakistan. Family Nymphalidae with their species are: *D. chrysippus*, *J. orytha*, *H. parisatis*, *A. hyperbius*, *J. almana*, *A. merione*, *C. carduii*, *T. limniace*, *V. indica*, *L. confuse*, *N. mahendra*, *E. garuda* and *J. hierta*.

Recommendation

To explore the whole butterfly fauna of Charsadda, Khyber Pakhtunkhwa, Pakistan, further research is recommended. However, the researchers and students should be expanded their cooperation and collaboration for the same. Furthermore, proper protective measures should be taken in attention in order to minimize the natural habitat loss, as butterfly fauna is dependent upon accurate environmental conditions. Moreover, the seminars, conferences, congresses, workshops and symposiums may be conducted for awareness and education of local community of Tehsil Tangi.

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