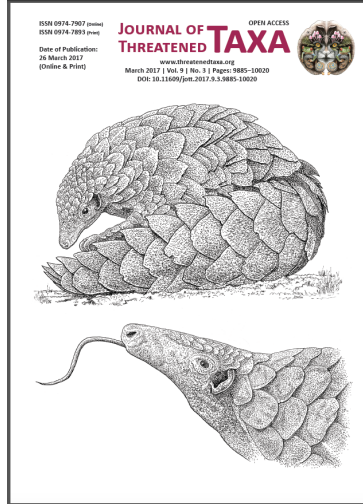


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SHORT COMMUNICATION

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Ibrahim Khalil Al Haidar, M. Mizanur Rahman, M. Farid Ahsan & M. Ariful Islam

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STATUS, ABUNDANCE AND HABITAT PREFERENCE OF BUTTERFLIES (INSECTA: LEPIDOPTERA) IN CHITTAGONG UNIVERSITY CAMPUS, CHITTAGONG, BANGLADESH

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Abstract: A study was conducted on the butterflies of the Chittagong University Campus (CUC), Bangladesh between March 2014 and May 2015. A total of 142 species of butterflies belonging to 87 genera and six families (Hesperiidae, Papilionidae, Pieridae, Lycaenidae, Riodinidae and Nymphalidae) were recorded from the CUC during the study period. Family Nymphalidae comprised the highest number of species followed by Lycaenidae, Hesperiidae, Pieridae, Papilionidae and Riodinidae. The abundance of this species stated in terms of very common, common, uncommon, rare and very rare. The butterflies used different types of habitat (viz., grass land, crop land, open forest, scrub forest, dense forest and bamboo patch) and among all, scrub forests were the most preferred habitat. Mud puddling of 35 species were also observed. Five species of butterflies (*Ampittia dioscorides*, *Matapa purpurascens*, *Polytremis eltola*, *Unkana ambasa* and *Ypthima ceylonica*) were recorded for the first time in Bangladesh.

Keywords: Abundance, Bangladesh, butterfly, Chittagong University Campus, habitat, status.

Butterflies are beautiful flying creatures of nature. Since the early 18th Century, 19,238 species of butterflies have been documented worldwide (Heppner 1998). The exact number of extant species of butterfly is not known but there are about 16,823 species spread throughout

the world (Landing 1984); of which 1,318 species have been recorded in India (Varshney & Smetacek 2015), 643 species in Nepal (Nepal Safari 2016), 247 species in Sri Lanka (van der Poorten & van der Poorten 2016), and 1,014 species in Myanmar (SST Tourism 2011).

Butterflies are not well documented in Bangladesh. Baksha & Choudhury (1983, 1985) identified respectively 17 species from the family Pieridae and 16 species from Papilionidae. Larsen (2004) annotated a list of butterflies and mentioned 236 species from Bangladesh. Ahmad et al. (2009) compiled 148 species in the country. Chowdhury & Hossain (2013) listed 225 species from Bangladesh and forecast that the number of species may exceed 400. So, more studies are needed to list the total number of butterflies in the country as new records are being added periodically.

In Bangladesh, some regional checklists have also been prepared. For instance, Khan (2001) accounted for 49 species from Tangail District; Chowdhury & Mohiuddin (2003) reported 121 species from the eastern border (Sylhet and Moulvi Bazar districts of

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Sylhet division, and Chittagong and four hill districts in Chittagong division). Hossain et al. (2003) recorded 51 species from Jahangirnagar University Campus. Khandokar et al. (2014) recorded 160 species from Lawachara National Park, Moulavibazar.

Alam & Ullah (1995) reported 22 species of butterfly from the Chittagong University Campus (CUC) and since their publication, no further studies have been conducted. Hence, it is needed to study the butterfly fauna of the CUC, which may also enrich the checklist of the country. On the other hand, status, abundance and types of habitat used by butterflies are useful to document in order to conserve these creatures and their habitats, which play a significant role in the ecosystem. Hence this study was designed with the major aims to know: (i) status of the recorded species in the CUC, (ii) abundance of occurrence of the butterfly families, and (iii) the species-wise habitat preference in the area.

MATERIALS AND METHODS

Study Area

The CUC (Fig. 1) is situated at Zubra Village under Fatehpur Union Parishad of Hathazari Upazila (sub-district) in Chittagong District, Bangladesh (22°27'30"–22°29'0"N & 91°46'30"–91°47'45"E). It is about 22km north of Chittagong City, 3km southwest of Hathazari Upazila headquarters and about 6km east from the Bay of Bengal. The CUC is surrounded by hills of the Chittagong hill region and bisected by a small stream. It is a large area compared to the other universities of the country comprising 710ha (1,754 acres) of land. The diversity of plants and animals is quite rich in the CUC compared to other universities of Bangladesh. It is covered with about 72% hills, lakes, ponds and plain lands and valleys are 15.9m above sea level (Islam et al. 1979). The soils of all profiles are characterized by coarse texture (38–73 % sand fraction), high bulk density (1.15–1.32 mgm⁻³), low organic-C content (0.26–1.73 %), and acid soil reaction (pH_{H2O} varied from 4.44 to 5.52 and pH_{KCl} from 3.57 to 4.90) (Akhtaruzzaman et al. 2014).

There are three seasons in the CUC like elsewhere in Bangladesh (Ahmad 1968): Summer (March–May), Monsoon (June–October) and Winter (November–February). About 60% land area of the CUC is covered by steep and very steep hills (Hossain et al. 2013); although it is composed of hills, valleys and plains. The vegetation is semi-evergreen (Ahsan & Khanom 2005). A total of 665 plant species under 126 families and 404 genera are found in the CUC, of which 550 are dicotyledons and 115 are monocotyledons (Alam & Pasha 1999).

Table 1. Assessment of status of butterflies

| Status | No. of occurrences |
|-------------|---|
| Very common | More than 45 occurrences (>75%) of the total observation days |
| Common | 30 to 44 occurrences (50–74 %) of the total observation days |
| Uncommon | 15 to 29 occurrences (25–49 %) of the total observation days |
| Rare | 6 to 14 occurrences (10–24 %) of the total observation days |
| Very rare | Less than 6 occurrences (≤10%) of the total observation days |

Field study

The study on butterflies was conducted in the CUC for 15 months between March 2014 and May 2015. A total of 60 days' observation was done during this study period. Field observations were done throughout the day but emphasis was given to bright sunny periods of the day when butterflies are more active. Opportunistic records of butterflies have also been included in the list. The whole study area was divided into six sites for convenience of the study (Fig. 1). Different types of habitat used by butterflies (viz., grass land, crop land, open forest: composed of trees, shrubs and grasses with discontinuous canopy, scrub forest: shrub land and bushy jungles, dense forest and bamboo patches) have also been recorded during the study.

Butterflies were surveyed through the existing roads, trails, streams and bridle paths for a whole day, once a week and covering all the sites of the CUC in a cyclic order in each month.

Species Identification

During surveys for butterflies, the species were recorded in a notebook and cryptic specimens were photographed using cameras (Canon EOS 600D with 75–300 mm IS II lens and Canon EOS 60D with 300mm prime lens) for confirming the species identities. Collection and killing of the specimens were avoided. The individuals were identified following the keys developed by Marshall & de Niceville (1883), Bingham (1905), Evans (1932) and Bashar (2014); and field guides (e.g., Chowdhury & Hossain 2013; Kehimkar 2013). In this study, butterflies were assessed as very common (vc), common (c), uncommon (uc), rare (r) and very rare (vr) (Table 1).

RESULTS

One-hundred-and-forty-two species of butterflies belonging to 87 genera and six families (Table 2) were recorded from the CUC during the study period. Family Nymphalidae comprised the highest number of species (47 species i.e., 33.1%) and Riodinidae comprised the

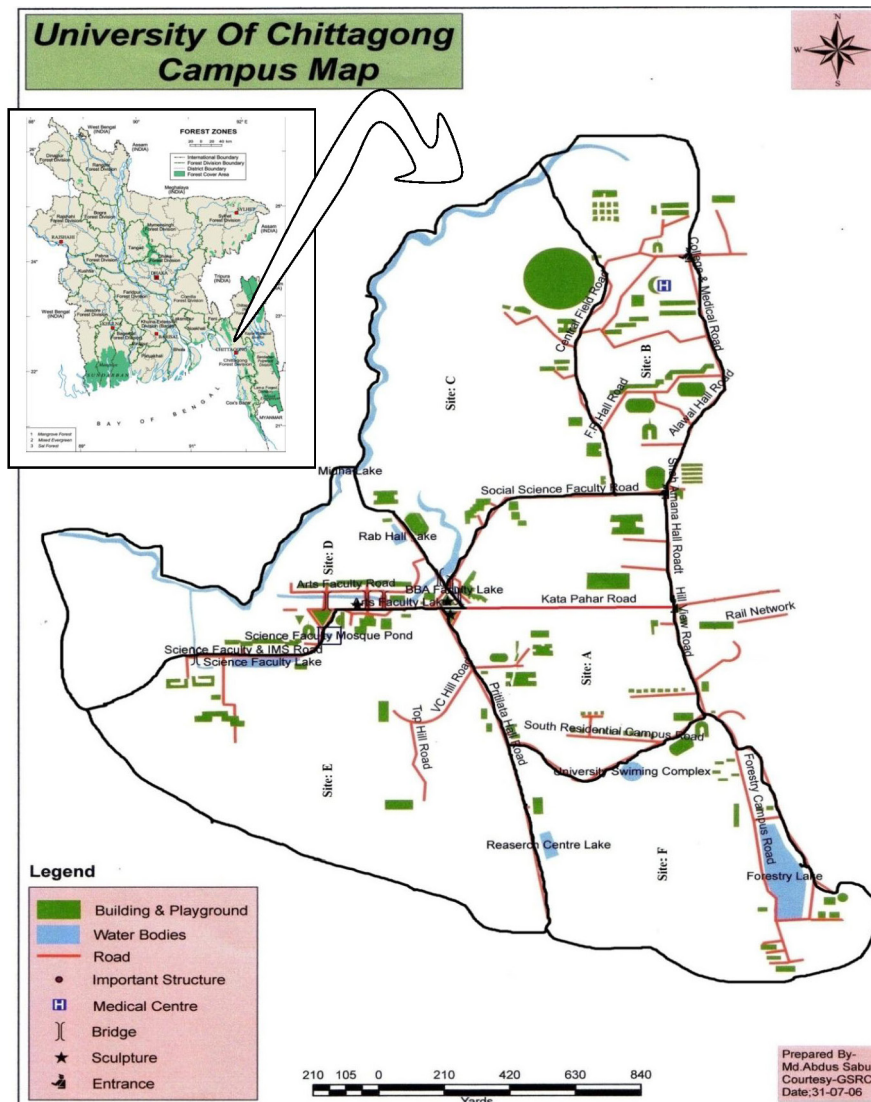


Figure 1. Chittagong University Campus

lowest (1 species i.e., 0.7%) (Table 3). Of the recorded species, 16.9% were very common, 22.5% common, 20.4% uncommon, 19.7% rare and 20.4% were very rare. Most of very common and common species belonged to the family Nymphalidae, uncommon to Lycaenidae, rare species to Hesperidae and very rare species belonged to Hesperidae and Lycaenidae (Table 3).

The CUC is an ecotone area connecting hilly forest with plain land and comprises grassland, cropland, open forest, scrub forest, dense forest, bamboo patch and hill streams for mud puddling. Hence, the butterflies get opportunities to use different types of habitat in the CUC (Figs. 2 & 3). Thirty-five (24.6%) of 142 species of butterflies used all kinds of habitat. Eighty-one species preferred multiple habitats. Out of these 81 species, one species (*Pachliopta Hector*: Papilionidae) preferred

five types of habitat, eight species (5.6%) chose four types, 27 species (19%) used three types, 44 species (31%) favored two types and the rest 27 species (19%) were observed only in a single habitat.

Mud puddling was observed in 35 species (Fig. 3), which comprised five families; and among them Lycaenidae accounted the highest number of species (15 species, 42.9%) and Hesperidae the lowest number (2 species, 5.7%).

During this study, *Ampittia dioscorides* Bush Hopper, *Matapa purpurascens* Purple Branded Redeye and *Unkana ambasa* Hoary Palmer under the family Hesperidae were recorded for the first time in Bangladesh. The record of *Ampittia dioscorides* has been confirmed by our sightings in Bangladesh on 18 April 2014 (22°27'43"N & 91°47'30"E; elevation

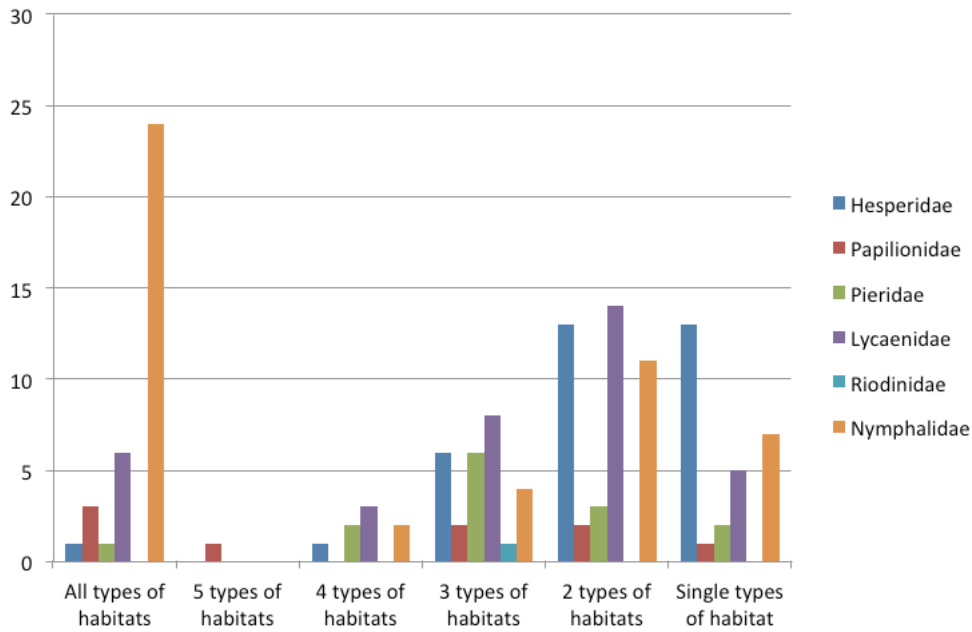


Figure 2. Number of habitat preferred by different butterfly families

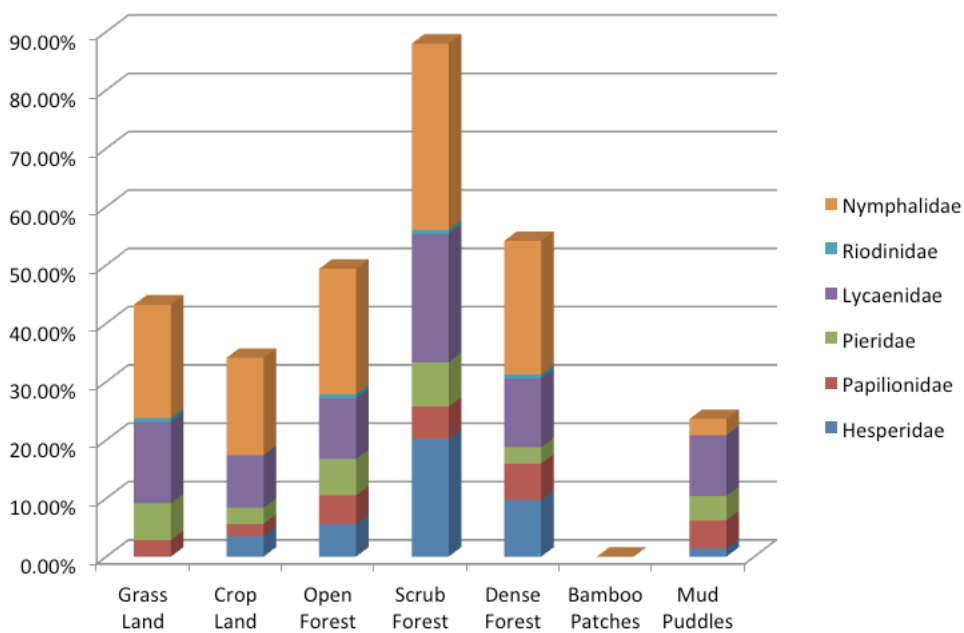


Figure 3. Types of habitat preferred by different butterfly families

14m); *M. purpurascens* was recorded for the first time in Bangladesh on 31 October 2014 (22°27'59"N & 91°47'16"E; 19m); and *U. ambasa* was recorded for the first time in Bangladesh on 10 June 2014 (22°27'54"N & 91°47'21"E; 17m).

Ypthima ceylonica (Nymphalidae) was observed on 05 March 2015 (22°27'47"N & 91°47'29"E; 26m) and *Polytremis eltola* (Hesperiidae) was observed on 03 March 2015 (22°27'41"N & 91°47'43"E; 18m) and were

also confirmed as new records for Bangladesh during the study. These five new records of butterfly species have not been included in any published literature about butterflies in Bangladesh (e.g., Chowdhury & Hossain 2013; Larsen 2004; IUCN Bangladesh 2015), and hence are new additions to Bangladesh's butterfly fauna.

Table 2. List of butterflies of the Chittagong University Campus, Bangladesh

| | Common name | Scientific name | CUC status ** | Habitat preference *** |
|-------------------------|-------------------------|---|---------------|------------------------|
| Family: Papilionidae | | | | |
| Subfamily: Papilioninae | | | | |
| 1 | Common Birdwing | <i>Troides helena</i> (Felder & Felder, 1865) | C | OF, SF, DF |
| 2 | Common Rose* | <i>Pachliopta aristolochiae aristolochiae</i> (Fabricius, 1775) | C | AH, MP |
| 3 | Crimson Rose | <i>Pachliopta hector</i> Linnaeus, 1758 | VR | GL, CL, OF, SF, DF |
| 4 | Citrus Butterfly* | <i>Papilio demoleus demoleus</i> Linnaeus, 1758 | VC | AH, MP |
| 5 | Yellow Helen | <i>Papilio helenus helenus</i> Westwood, 1845 | R | SF, DF, MP |
| 6 | Common Mormon* | <i>Papilio polytes romulus</i> Cramer, 1775 | VC | AH, MP |
| 7 | Great Mormon* | <i>Papilio memnon agenor</i> Linnaeus, 1758 | C | OF, SF, DF, MP |
| 8 | Common Mime | <i>Chilasa clytia clytia</i> Linnaeus, 1758 | UC | OF, SF, MP |
| 9 | Common Jay | <i>Graphium dason</i> (Felder & Felder, 1864) | VR | OF, SF, DF, MP |
| 10 | Tailed Jay | <i>Graphium agamemnon agamemnon</i> (Linnaeus, 1758) | VR | OF, MP |
| Family: Pieridae | | | | |
| Subfamily: Coliadinae | | | | |
| 11 | Lemon Emigrant* | <i>Catopsilia pomona pomona</i> (Fabricius, 1775) | VC | AH, MP |
| 12 | Mottled Emigrant | <i>Catopsilia pyranthe pyranthe</i> (Linnaeus, 1758) | UC | GL, SF, MP |
| 13 | Three-Spot Grass Yellow | <i>Eurema blanda silhetana</i> (Wallace, 1867) | R | GL, OF, SF |
| 14 | Common Grass Yellow* | <i>Eurema hecabe hecabe</i> (Linnaeus, 1758) | VC | GL, CL, MP |
| 15 | One Spot Grass Yellow | <i>Eurema andersoni</i> (Moore, 1886) | VR | GL |
| Subfamily: Pierinae | | | | |
| 16 | Great Orange Tip | <i>Hebomoia glaucippe glaucippe</i> (Linnaeus, 1758) | R | OF, SF, DF, MP |
| 17 | Indian Cabbage White | <i>Pieris canidia canis</i> Evans, 1926 | R | GL, OF, SF |
| 18 | Chocolate Albatross | <i>Appias lyncida eleonora</i> (Boisduval, 1836) | R | GL, OF, SF, MP |
| 19 | Striped Albatross | <i>Appias libythea olferna</i> Swinhoe, 1890 | C | GL, CL, OF, SF, MP |
| 20 | Common Albatross | <i>Appias albina</i> (Boisduval, 1836) | VR | SF |
| 21 | Common Wanderer | <i>Parerania hippia</i> Fabricius, 1787 | VR | SF |
| 22 | Psyche | <i>Leptosia nina nina</i> (Fabricius, 1793) | VC | GL, CL |
| 23 | Painted Jezebel* | <i>Delias hyparete indica</i> (Wallace, 1867) | UC | OF, SF, DF |
| 24 | Red-spot Jezebel* | <i>Delias descombesi descombesi</i> (Boisduval, 1836) | C | CL, OF, SF, DF |
| 25 | Red-base Jezebel | <i>Delias pasithoe pasithoe</i> (Linnaeus, 1767) | R | OF, SF, DF |

| | Common name | Scientific name | CUC status ** | Habitat preference *** |
|------------------------|------------------------|---|---------------|------------------------|
| Family: Lycaenidae | | | | |
| Subfamily: Miletinae | | | | |
| 26 | Apefly | <i>Spalgis epeus</i> (Westwood, 1851) | VR | SF, DF |
| Subfamily: Theclinae | | | | |
| 27 | Vinous Oakblue | <i>Arhopala athada</i> (Staudinger, 1889) | R | GL, SF |
| 28 | Green Oakblue | <i>Arhopala eumolphus</i> (Cramer, 1780) | UC | SF, DF |
| 29 | Centaur Oakblue | <i>Arhopala centaurus pirthous</i> Moore, 1883 | R | SF, DF |
| 30 | Purple-glazed Oakblue | <i>Arhopala agaba agaba</i> (Hewitson, 1862) | VC | AH |
| 31 | Falcate Oakblue | <i>Mahathala ameria</i> (Hewitson, 1862) | VR | SF |
| 32 | Common Acacia Blue | <i>Surendra quercetorum</i> (Moore, 1858) | VR | SF, DF |
| 33 | Silverstreak Blue | <i>Iraota timoleon</i> (Stoll, 1790) | VR | SF, MP |
| 34 | Common Tinsel | <i>Catapaecilma major major</i> Druce, 1895 | R | SF, DF |
| 35 | Yamfly | <i>Loxura atymnus continentalis</i> Fruhstorfer, 1912 | C | AH, MP |
| 36 | Long-banded Silverline | <i>Spindasis lohita himalayanus</i> (Moore, 1884) | R | GL, SF |
| 37 | Club Silverline | <i>Spindasis syama</i> (Moore, 1884) | R | GL, OF, SF, DF, MP |
| 38 | Common Tit | <i>Hypolycaena erylus</i> Godart, 1824 | R | SF, DF, MP |
| 39 | Slate Flash | <i>Rapala manea</i> Hewitson, 1863 | UC | SF, DF |
| 40 | Scarlet Flash | <i>Rapala dienece</i> (Hewitson, 1878) | VR | SF |
| Subfamily: Polyommatae | | | | |
| 41 | Pointed Ciliate Blue | <i>Anthene lycaenina</i> (Felder, 1868) | VR | SF, MP |
| 42 | Common Ciliate Blue | <i>Anthene emolus emolus</i> (Godart, 1824) | UC | OF, SF, MP |
| 43 | Common Lineblue | <i>Prosotas nora ardates</i> (Moore, 1875) | C | GL, OF, SF, DF, MP |
| 44 | Tailless Lineblue | <i>Prosotas dubiosa</i> (Evans, 1925) | R | GL, OF, SF, MP |
| 45 | Teesta Brown Lineblue | <i>Prosotas lutea sivoka</i> (Evans, 1910) | VR | SF, DF, MP |
| 46 | Angled Pierrot | <i>Caleta decidia</i> (Hewitson, 1876) | R | GL, OF, SF, MP |
| 47 | Banded Blue Pierrot | <i>Discolampa ethion</i> (Westwood, 1851) | UC | GL, OF, SF |
| 48 | Common Cerulean | <i>Jamides celeno</i> (Cramer, 1775) | VC | AH, MP |
| 49 | Dark Cerulean | <i>Jamides bochus</i> (Stoll, 1782) | UC | SF, DF, MP |
| 50 | Pea Blue | <i>Lampides boeticus</i> (Linnaeus, 1767) | UC | GL, CL |
| 51 | Common Pierrot | <i>Castalius rosimon</i> (Fabricius, 1775) | VC | AH |
| 52 | Dark Grass Blue | <i>Zizeeria karsandra</i> (Moore, 1865) | C | GL, CL, OF |
| 53 | Lesser Grass Blue | <i>Zizina otis otis</i> (Fabricius, 1787) | C | GL, CL |

| | Common name | Scientific name | CUC status ** | Habitat preference *** |
|------------------------|------------------------|--|---------------|------------------------|
| 54 | Pale Grass Blue | <i>Pseudozizeeria maha maha</i> (Kollar, 1844) | UC | GL, CL, OF |
| 55 | Quaker | <i>Neopitheops zalmora zalmora</i> (Butler, 1870) | VC | AH, MP |
| 56 | Gram Blue | <i>Euchrysops cnejus</i> (Fabricius, 1798) | UC | GL, CL, OF, SF |
| 57 | Forget-me-not | <i>Catochrysops strabo strabo</i> (Fabricius, 1793) | C | AH, MP |
| 58 | Silver Forget-me-not | <i>Catochrysops panormus</i> (Distant, 1886) | VR | SF |
| 59 | Plains Cupid | <i>Chilades pandava</i> Horsfield, 1829 | UC | GL, CL, SF |
| 60 | Lime Blue | <i>Chilades lajus lajus</i> (Stoll, 1870) | UC | GL, CL, SF, MP |
| Family: Riodinidae | | | | |
| Subfamily: Nemeobiinae | | | | |
| 61 | Punchinello | <i>Zemeros flegyas</i> Cramer, 1780 | C | OF, SF, DF |
| Family: Nymphalidae | | | | |
| Subfamily: Danainae | | | | |
| 62 | Dark Glassy Tiger | <i>Parantica agleoides</i> (Felder & Felder, 1860) | UC | SF, DF |
| 63 | Glassy Tiger | <i>Parantica aglea aglea</i> Stoll, 1782 | C | SF, DF |
| 64 | Blue Tiger | <i>Tirumala limniace exotica</i> (Gmélín, 1790) | UC | AH |
| 65 | Plain Tiger* | <i>Danaus chrysippus chrysippus</i> (Linnaeus, 1758) | C | AH |
| 66 | Striped Tiger* | <i>Danaus genutia genutia</i> (Cramer, 1779) | C | AH |
| 67 | Striped Blue Crow | <i>Euploea mulciber mulciber</i> (Cramer, 1777) | UC | SF, DF |
| 68 | Blue-spotted Crow | <i>Euploea midamus</i> (Linnaeus, 1758) | VR | GL, SF |
| 69 | Brown King Crow | <i>Euploea klugii klugii</i> Moore, 1858 | R | SF |
| 70 | Common Crow | <i>Euploea core core</i> (Cramer, 1780) | VC | AH, MP |
| Subfamily: Satyrinae | | | | |
| 71 | Common Evening Brown | <i>Melanitis leda leda</i> (Linnaeus, 1758) | VC | AH |
| 72 | Common Palmfly | <i>Elymnias hypermnestra undularis</i> (Drury, 1773) | VC | AH |
| 73 | Spotted Palmfly | <i>Elymnias malelas</i> (Hewitson, 1865) | VR | SF |
| 74 | Bamboo Treebrown | <i>Lethe europa</i> (Fabricius, 1780) | R | BP |
| 75 | Common Bushbrown | <i>Mycalesis perseus blasius</i> (Fabricius, 1798) | VC | AH |
| 76 | Dark Branded Bushbrown | <i>Mycalesis mineus</i> (Linnaeus, 1758) | C | GL, OF, SF, BP |
| 77 | Nigger | <i>Orsotriaena medus medus</i> (Fabricius, 1775) | VC | AH |
| 78 | Lesser Threering | <i>Ypthima inica</i> Hewitson, 1864 | C | GL, OF, SF |
| 79 | Common Fourring | <i>Ypthima huebneri</i> Kirby, 1871 | C | AH |
| 80 | Common Fivering | <i>Ypthima baldus</i> (Fabricius, 1775) | VC | AH |
| 81 | White Fourring | <i>Ypthima ceylonica</i> Hewitson, 1864 | VR | SF |

| | Common name | Scientific name | CUC status ** | Habitat preference *** |
|--------------------------|--------------------------|--|---------------|------------------------|
| Subfamily: Morphinae | | | | |
| 82 | Common Duffer | <i>Discophora sondaica zal</i> Westwood, 1851 | R | BP, SF |
| Subfamily: Charaxinae | | | | |
| 83 | Indian Nawab | <i>Polyura bhārata</i> (Drury, 1773) | VR | SF, DF, MP |
| 84 | Pallid Nawab | <i>Polyura arja</i> (Felder & Felder, 1867) | VR | SF, MP |
| Subfamily: Heliconiinae | | | | |
| 85 | Tawny Coster | <i>Acraea violae</i> (Fabricius, 1775) | C | AH |
| 86 | Leopard Lacewing* | <i>Cethosia cyane</i> Drury, 1773 | R | CL, SF |
| 87 | Common Leopard | <i>Phalanta phalantha phalantha</i> (Drury, 1770) | C | AH |
| 88 | Rustic | <i>Cupha erymanthis lotis</i> (Sulzer, 1776) | UC | SF, DF |
| Subfamily: Limenitidinae | | | | |
| 89 | Common Baron | <i>Euthalia aconthea garuda</i> (Moore, 1858) | C | AH |
| 90 | Common Earl | <i>Tanaecia julii</i> Ménétériés, 1857 | VR | SF, DF |
| 91 | Grey Count | <i>Tanaecia lepidea lepidea</i> (Butler, 1868) | VC | OF, SF |
| 92 | Knight | <i>Lebadea martha martha</i> (Fabricius, 1787) | VC | OF, SF, DF |
| 93 | Clipper | <i>Parthenos sylvia gambrius</i> (Fabricius, 1787) | VR | DF |
| 94 | Common Sergeant | <i>Athyma perius</i> (Linnaeus, 1758) | C | GL, OF, SF, DF |
| 95 | Color Sergeant | <i>Athyma inara inara</i> Doubleday, 1848 | UC | AH, MP |
| 96 | Commander | <i>Moduza procris</i> (Cramer, 1777) | UC | OF, SF, DF |
| 97 | Common Lascar | <i>Pantoporia hordonia hordonia</i> (Stoll, 1790) | C | AH |
| 98 | Common Sailer | <i>Neptis hylas</i> Moore, 1872 | VC | AH |
| 99 | Clear Sailer | <i>Neptis clinia susruta</i> Moore, 1872 | C | GL, OF, SF |
| 100 | Chestnut-streaked Sailer | <i>Neptis jumbah</i> Moore, 1857 | UC | OF, SF |
| Subfamily: Biblidinae | | | | |
| 101 | Common Castor | <i>Ariadne merione tapestrina</i> (Moore, 1884) | C | AH |
| 102 | Angled Castor | <i>Ariadne ariadne pallidior</i> (Fruhstorfer, 1899) | C | AH |
| Subfamily: Nymphalinae | | | | |
| 103 | Great Eggfly | <i>Hypolimnas bolina</i> (Linnaeus, 1758) | C | AH |
| 104 | Yellow Pansy* | <i>Junonia hierta</i> (Fabricius, 1798) | C | AH |
| 105 | Lemon Pansy | <i>Junonia lemonias lemonias</i> (Linnaeus, 1758) | VC | AH |
| 106 | Peacock Pansy | <i>Junonia almana almana</i> (Linnaeus, 1758) | VC | AH |
| 107 | Grey Pansy | <i>Junonia atlites atlites</i> (Linnaeus, 1763) | VC | AH |
| 108 | Chocolate Pansy | <i>Junonia iphita iphita</i> (Cramer, 1779) | VC | AH |

| | Common name | Scientific name | CUC status ** | Habitat preference *** |
|------------------------|-----------------------------|---|---------------|------------------------|
| Family: Hesperidae | | | | |
| Subfamily: Coeliadinae | | | | |
| 109 | Common Spotted Flat | <i>Celaenorrhinus leucocera</i> (Kollar, 1844) | VR | OF, SF |
| 110 | Common Small Flat | <i>Sarangesa dasahara</i> Moore, 1866 | UC | OF, SF |
| 111 | Common Snow Flat | <i>Tagiades japedus ravi</i> (Moore, 1866) | VC | OF, SF |
| Subfamily: Hesperinae | | | | |
| 112 | Forest Hopper | <i>Astictopterus jama olivascens</i> Moore, 1878 | VR | SF, DF, MP |
| 113 | Bush Hopper | <i>Ampittia dioscorides</i> (Fabricius, 1793) | R | GL, CL, OF |
| 114 | Pigmy Scrub Hopper | <i>Aeromachus pygmaeus</i> (Fabricius, 1775) | UC | GL |
| 115 | Chestnut Bob | <i>Iambrix salsala salsala</i> (Moore, 1866) | VC | AH |
| 116 | Coon | <i>Psolos fuligo</i> (Mabille, 1876) | C | OF, SF, DF |
| 117 | Grass Demon | <i>Udaspes folus</i> (Cramer, 1775) | UC | GL, SF, DF |
| 118 | Chocolate Demon | <i>Ancistroides nigrita</i> (Latreille, 1824) | UC | SF, DF |
| 119 | Restricted Demon | <i>Notocrypta curvifascia curvifascia</i> (Felder & Felder, 1862) | VR | SF, DF |
| 120 | Tree Flitter | <i>Hyarotis adrastus praba</i> (Moore, 1866) | UC | OF, SF, DF |
| 121 | Giant Redeye | <i>Gangara thyrsis</i> (Fabricius, 1775) | R | DF, MP |
| 122 | Common Redeye | <i>Matapa aria</i> (Moore, 1866) | UC | SF, DF |
| 123 | Black-veined Branded Redeye | <i>Matapa sasivarna</i> (Moore, 1866) | R | SF, DF |
| 124 | Purple Branded Redeye | <i>Matapa purpurascens</i> Elwes & Edwards, 1897 | VR | DF |

| | Common name | Scientific name | CUC status ** | Habitat preference *** |
|-----|-------------------------|---|---------------|------------------------|
| 125 | Common Grass dart | <i>Taractrocera maevius</i> Fabricius, 1793 | UC | GL, CL, SF |
| 126 | Common Dartlet | <i>Oriens gola pseudolus</i> (Mabille, 1883) | R | SF |
| 127 | Pale Palm Dart | <i>Telicota colon</i> Fabricius, 1775 | C | GL, CL, SF |
| 128 | Dark Palm dart | <i>Telicota bambusae</i> (Moore, 1878) | C | GL, CL, OF, SF |
| 129 | Contiguous Swift | <i>Polytremis lubricans</i> (Herrich-Schäffer, 1869) | R | SF, DF |
| 130 | Straight Swift | <i>Parnara guttatus mangala</i> Moore, 1865 | C | SF |
| 131 | Ceylon Swift | <i>Parnara bada</i> Moore, 1878 | UC | SF |
| 132 | Chinese Swift | <i>Pelopidas sinensis</i> Mabille, 1877 | R | SF |
| 133 | Obscure Branded Swift | <i>Pelopidas agna</i> (Moore, 1866) | C | SF |
| 134 | Large Branded Swift | <i>Pelopidas subochracea</i> Moore, 1878 | VR | OF, SF |
| 135 | Small Branded Swift | <i>Pelopidas mathias</i> (Fabricius, 1798) | R | GL, SF |
| 136 | Conjoined Swift | <i>Pelopidas conjuncta conjuncta</i> (Herrich-Schäffer, 1869) | R | GL, SF |
| 137 | Great Swift | <i>Pelopidas assamensis</i> (de Nicéville, 1882) | VR | SF |
| 138 | Paintbrush Swift | <i>Baoris farri</i> (Moore, 1878) | UC | SF, DF |
| 139 | Blank Swift | <i>Caltois kumara</i> Moore, 1878 | R | SF, DF |
| 140 | Yellow Spot Swift | <i>Polytremis eltola</i> (Hewitson, 1869) | VR | SF |
| 141 | Indian Grizzled Skipper | <i>Spialia galba</i> (Fabricius, 1773) | R | GL |
| 142 | Hoary Palmer | <i>Unkana ambasa</i> Moore, 1858 | VR | SF |

* Marked butterflies are previously recorded from the study area; **VC - very common, C - common, UC - uncommon, R - rare, VR - very rare; ***AH - all habitat, GL - grass land, CL - crop land, OF - open forest, SF - scrub forest, DF - dense forest, BP - bamboo patches, MP - mud puddles.

Table 3. Relative abundance of butterflies in the Chittagong University Campus.

| | Family | Relative abundance | | | | | Number of species (% of 142) |
|-------|--------------|-----------------------|------------------|--------------------|----------------|---------------------|------------------------------|
| | | Very common (% of 24) | Common (% of 32) | Uncommon (% of 29) | Rare (% of 28) | Very rare (% of 29) | |
| 1 | Papilionidae | 2 (8.3%) | 3 (9.4%) | 1 (3.5%) | 1 (3.6%) | 3 (10.3%) | 10 (7%) |
| 2 | Pieridae | 3 (12.5%) | 2 (6.3%) | 2 (6.9%) | 5 (17.9%) | 3 (10.3%) | 15 (10.6%) |
| 3 | Lycaenidae | 4 (16.7%) | 5 (15.6%) | 10 (34.5%) | 8 (28.6%) | 8 (27.6%) | 35 (24.7%) |
| 4 | Riodinidae | - | 1 (3.1%) | - | - | - | 1 (0.7%) |
| 5 | Nymphalidae | 13 (54.1%) | 16 (50%) | 7 (24.1%) | 4 (14.3%) | 7(24.1%) | 47(33.1%) |
| 6 | Hesperidae | 2 (8.3%) | 5 (15.6%) | 9 (31%) | 10 (35.7%) | 8 (27.6%) | 34 (23.9%) |
| Total | | 24 | 32 | 29 | 28 | 29 | 142 |

DISCUSSION AND CONCLUSION

A total of 142 species of butterfly in the CUC are very significant compared to the previous list of 22 species by Alam & Ullah (1995). The CUC is situated at the edge of hill forest just joining the Shitakunda forest line with plain land of Hathazari. Hence, the CUC supports the unique habitats for butterflies, viz., grassland, cropland, open forest, scrub forest, dense forest, bamboo patches, lakes, ponds and sandy hill streams. Among them, scrub forest is very important habitat for butterflies that supports 88.7% of the species (126 species) in the CUC (Fig. 3). In the CUC, the butterflies that preferred three and/or more types of habitat were more abundant than those that preferred only one or two types of habitat.

Very interestingly, 59.2% (29 [13 VC and 16 C] of 49) of nymphalid butterflies were very common and common in the CUC, because 49% (24 of 49 species) of them used all possible kinds of habitat. On the other hand, 79.4% (27 of 34 species) hesperiid butterflies preferred single type or two types of habitat in the CUC and 79.4% (27 [7 VR, 11 R and 9 UC] of 34) of them have been assessed as very rare, rare and uncommon. So, conservation and development of butterfly habitats will determine the future diversity of butterflies in the CUC.

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Image 1. *Troides helena* (Felder & Felder, 1865)



Image 2. *Pachliopta aristolochiae aristolochiae* (Fabricius, 1775)

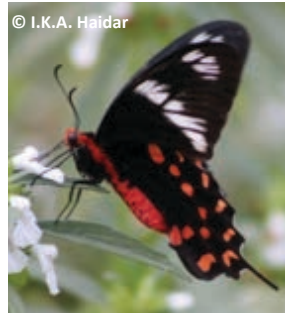


Image 3. *Pachliopta hector* Linnaeus, 1758

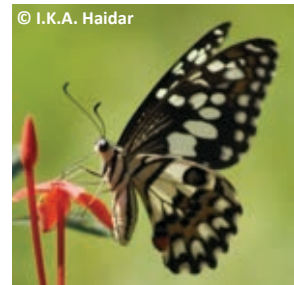


Image 4. *Papilio demoleus demoleus* Linnaeus, 1758,



Image 5. *Papilio helenus chaon* Westwood, 1845

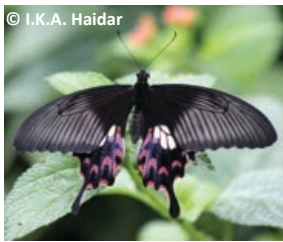


Image 6. *Papilio polytes romulus* Cramer, 1775

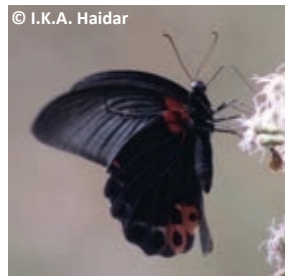


Image 7. *Papilio memnon agenor* Linnaeus, 1758



Image 8. *Chilasa clytia clytia* Linnaeus, 1758

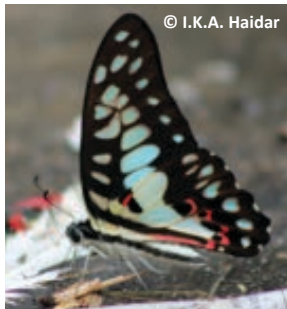


Image 9. *Graphium doson* (Felder & Felder, 1864)

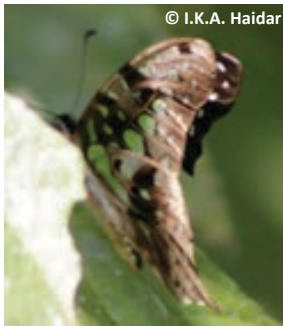


Image 10. *Graphium agamemnon agamemnon* (Linnaeus, 1758)



Image 11. *Catopsilia pomona pomona* (Fabricius, 1775)



Image 12. *Catopsilia pyranthe pyranthe* (Linnaeus, 1758)



Image 13. *Eurema blanda silhetana* (Wallace, 1867)



Image 14. *Eurema hecabe hecabe* (Linnaeus, 1758)



Image 15. *Eurema andersoni* (Moore, 1886)



Image 16. *Hebomoia glaucippe glaucippe* (Linnaeus, 1758)



Image 17. *Pieris canidia canis* Evans, 1926



Image 18. *Appias lycinda eleonora* (Boisduval, 1836)



Image 19. *Appias libythea olferna* Swinhoe, 1890



Image 20. *Appias albina* (Boisduval, 1836)



Image 21. *Pareronia hippia* Fabricius, 1787



Image 22. *Leptosia nina nina* (Fabricius, 1793)

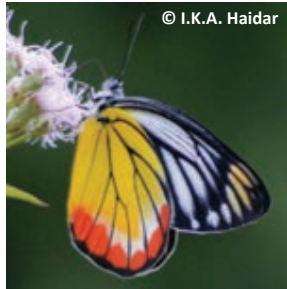


Image 23. *Delias hyparete indica* (Wallace, 1867)



Image 24. *Delias descombesi descombesi* (Boisduval, 1836)



Image 25. *Delias pasithoe pasithoe* (Linnaeus, 1767)



Image 26. *Spalgis epeus* (Westwood, 1851)



Image 27. *Arhopala athada* (Staudinger, 1889)

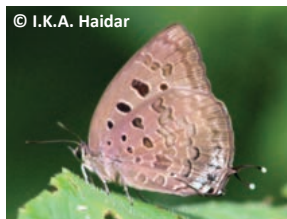


Image 28. *Arhopala eumolpus* (Cramer, 1780)



Image 29. *Arhopala centaurus pirthous* Moore, 1883

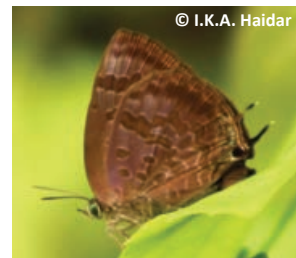


Image 30. *Arhopala agaba agaba* (Hewitson, 1862)



Image 31. *Mahathala ameria* (Hewitson, 1862)



Image 32. *Surendra quercetorum* (Moore, 1858)



Image 33. *Iraota timoleon* (Stoll, 1790)



Image 34. *Catapaecilma major major* Druce, 1895



Image 35. *Loxura atymnus continentalis* Fruhstorfer, 1912

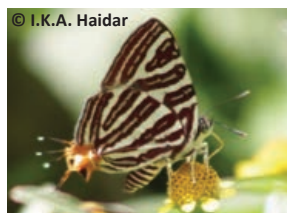


Image 36. *Spindasis lohita himalayanus* (Moore, 1884)



Image 37. *Spindasis syama* (Moore, 1884)



Image 38. *Hypolycaena erylus* Godart, 1824



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Image 39. *Rapala manea* Hewitson, 1863



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Image 40. *Rapala dienece* (Hewitson, 1878)



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Image 41. *Anthene lycaenina* (Felder, 1868)



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Image 42. *Anthene emolus emolus* (Godart, 1824)



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Image 43. *Prosotas nora ardates* (Moore, 1875)



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Image 44. *Prosotas dubiosa* (Evans, 1925)



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Image 45. *Prosotas lutea sivoka* (Evans, 1910)



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Image 46. *Caleta decidia* (Hewitson, 1876)



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Image 47. *Discolampa ethion* (Westwood, 1851)



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Image 48. *Jamides celeno* (Cramer, 1775)



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Image 49. *Jamides bochus* (Stoll, 1782)



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Image 50. *Lampides boeticus* (Linnaeus, 1767)



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Image 51. *Castalius rosimon* (Fabricius, 1775)



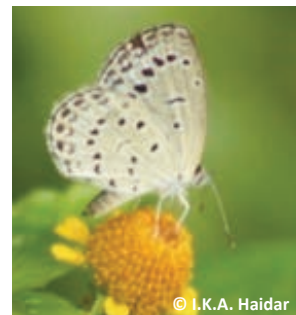
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Image 52. *Zizeeria karsandra* (Moore, 1865)



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Image 53. *Zizina otis otis* (Fabricius, 1787)



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Image 54. *Pseudozizeeria maha maha* (Kollar, 1844)



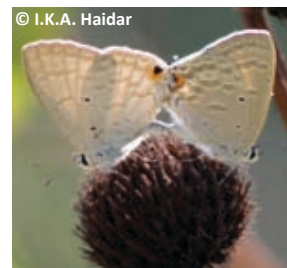
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Image 55. *Neopithecops zalmora zalmora* (Butler, 1870)



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Image 56. *Euchrysops cnejus* (Fabricius, 1798)



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Image 57. *Catochrysops strabo strabo* (Fabricius, 1793)



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Image 58. *Catochrysops panormus* (Distant, 1886)



Image 59. *Chilades pandava* Horsfield, 1829



Image 60. *Chilades lajus lajus* (Stoll, 1870)



Image 61. *Zemerus flegyas* Cramer, 1780

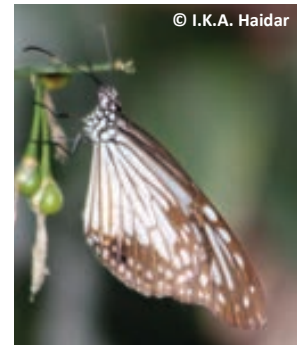


Image 62. *Parantica agleoides* (Felder & Felder, 1860)

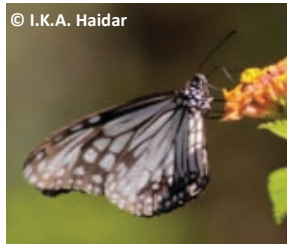


Image 63. *Parantica aglea aglea* Stoll, 1782



Image 64. *Tirumala limniace exoticus* (Gmélín, 1790)



Image 65. *Danaus chrysippus chrysippus* (Linnaeus, 1758)



Image 66. *Danaus genutia genutia* (Cramer, 1779)



Image 67. *Euploea mulciber mulciber* (Cramer, 1777)



Image 68. *Euploea midamus* (Linnaeus, 1758)

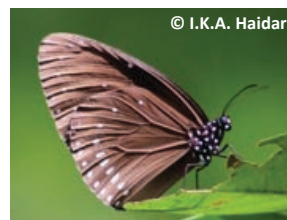


Image 69. *Euploea klugii klugii* Moore, 1858



Image 70. *Euploea core core* (Cramer, 1780)



Image 71. *Melanitis leda leda* (Linnaeus, 1758)



Image 72. *Elymnias hypermnestra undularis* (Drury, 1773)

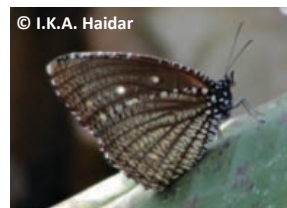


Image 73. *Elymnias malelas* (Hewitson, 1865)

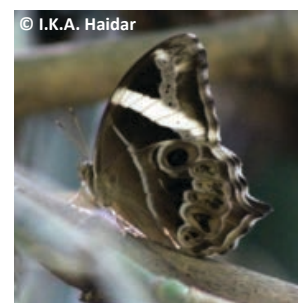


Image 74. *Lethe europa* (Fabricius, 1780)



Image 75. *Mycalesis perseus blasius* (Fabricius, 1798)

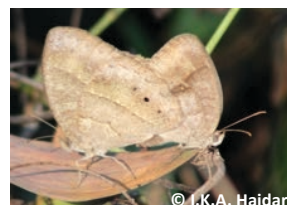


Image 76. *Mycalesis mineus* (Linnaeus, 1758)



Image 77. *Orsotriaena medus medus* (Fabricius, 1775)



Image 78. *Ypthima inica* Hewitson, 1864

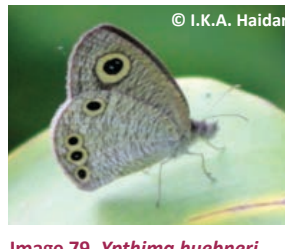


Image 79. *Ypthima huebneri* Kirby, 1871

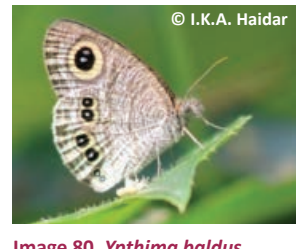


Image 80. *Ypthima baldus* (Fabricius, 1775)



Image 81. *Ypthima ceylonica* Hewitson, 1864



Image 82. *Discophora sondaica* zai Westwood, 1851



Image 83. *Polyura bharata* (Drury, 1773)



Image 84. *Polyura arja* (Felder & Felder, 1867)



Image 85. *Acraea violae* (Fabricius, 1775)



Image 86. *Cethosia cyane* Drury, 1773



Image 87. *Phalanta phalantha phalantha* (Drury, 1770)



Image 88. *Cupha erymanthis lotis* (Sulzer, 1776)



Image 89. *Euthalia aconthea garuda* (Moore, 1858)



Image 90. *Tanaecia julii* Ménétrés, 1857

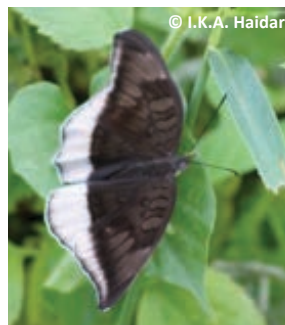


Image 91. *Tanaecia lepidea lepidea* (Butler, 1868)

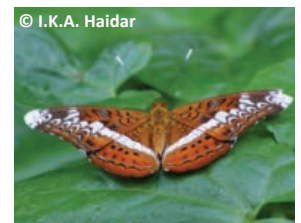


Image 92. *Lebadea martha martha* (Fabricius, 1787)

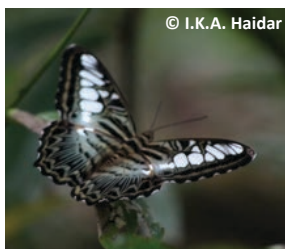


Image 93. *Parthenos sylvia gambrius* (Fabricius, 1787)

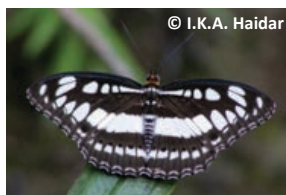


Image 94. *Athyma perius* (Linnaeus, 1758)



Image 95. *Athyma inara inara* Doubleday, 1848

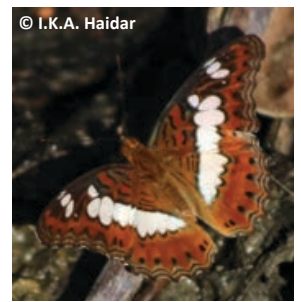


Image 96. *Moduza procris* (Cramer, 1777)



Image 97. *Pantoporia hordonia hordonia* (Stoll, 1790)

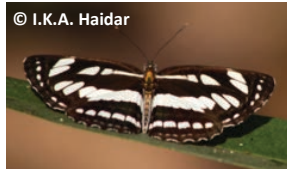


Image 98. *Neptis hylas* Moore, 1872



Image 99. *Neptis clinia susruta* Moore, 1872



Image 100. *Neptis jumbah* Moore, 1857

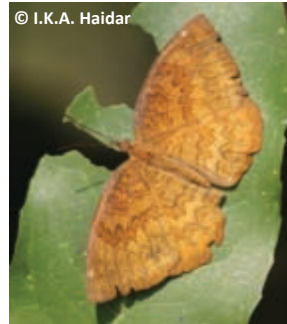


Image 101. *Ariadne merione tapestrina* (Moore, 1884)



Image 102. *Ariadne ariadne pallidior* (Fruhstorfer, 1899)

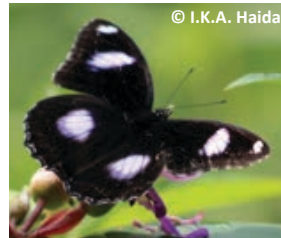


Image 103. *Hypolimnas bolina* (Linnaeus, 1758)



Image 104. *Junonia hierta* (Fabricius, 1798)

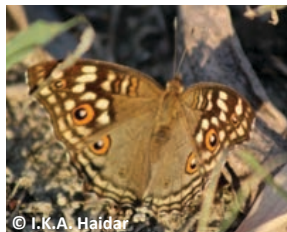


Image 105. *Junonia lemonias lemonias* (Linnaeus, 1758)

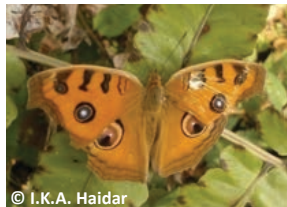


Image 106. *Junonia almana almana* (Linnaeus, 1758)



Image 107. *Junonia atlites atlites* (Linnaeus, 1763)



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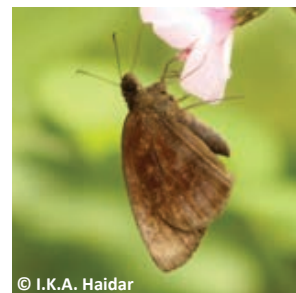


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Image 117. *Udaspes folus* (Cramer, 1775)



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Image 122. *Matapa aria* (Moore, 1866)



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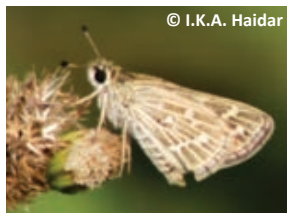


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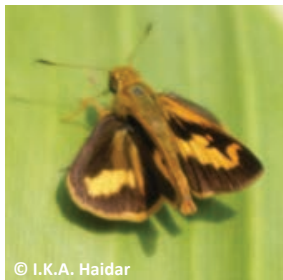


Image 126. *Oriens gola pseudolus* (Mabille, 1883)

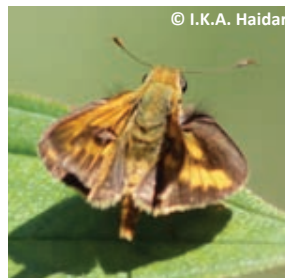


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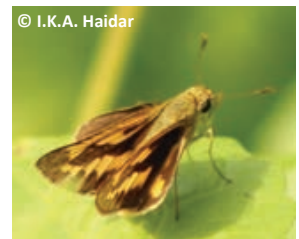


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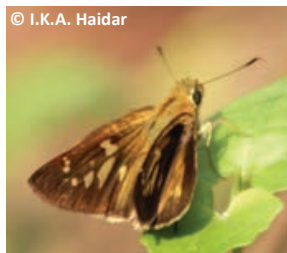


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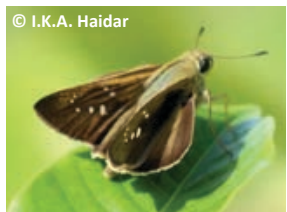


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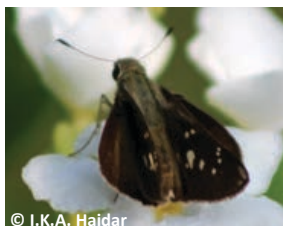


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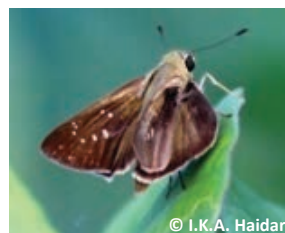


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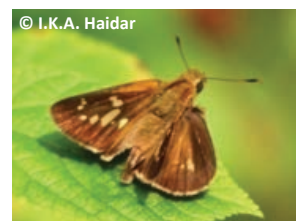


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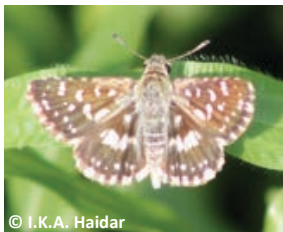


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