

New records of butterflies (Lepidoptera: Insecta) from Jammu and Kashmir Himalaya

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Abstract

Himalayas represents one of the unique ecosystems in terms of species diversity and species richness. While studying taxa of butterflies in Jammu and Rajouri districts located in Western Himalaya, fourteen species (*Abisara bifasciata* Moore, *Pareronia hippia* Fabricius, *Elymnias hypermnestra* Linnaeus, *Acraea terpsicore* Linnaeus, *Charaxes solon* Fabricius, *Symphaedra nais* Forster, *Neptis jumbah* Moore, *Moduza procris* Cramer, *Athyma cama* Moore, *Tajuria jehana* Moore, *Arhopala amantes* Hewitson, *Jamides celeno* Cramer, *Everes lacturnus* Godart and *Udaspes folus* Cramer) are recorded for the first time from the Union territory of Jammu and Kashmir. Investigations for butterflies were carried by following visual encounter method between 2014 and 2019 in morning hours from 7 am to 11 am throughout breeding seasons in Jammu and Rajouri districts. This communication deals with peculiar taxonomical identity, common name, global distribution, IUCN status and photographs of newly recorded butterflies.

Keywords: Butterflies, Himalayas, New Record, Species, Jammu & Kashmir

Introduction

Butterflies (Class: INSECTA Linnaeus, 1758, Order: LEPIDOPTERA Linnaeus, 1758) are holometabolous group of living organism as they complete metamorphosis cycles in four stages, viz. egg or embryo, larva or caterpillar, pupa or chrysalis and imago or adult (Gullan and Cranston, 2004; Capinera, 2008). These seasonal polymorphism groups were useful in natural ecosystem as pollinators and as food in the ecological food chain. Taxonomists often disagree about whether any particular taxon of a butterfly were a full species or just a subspecies or form, therefore, published estimates of the total number of described butterfly taxa in the world ranges from 17,000-20,000 (Shields, 1989; Robbins, 1982). Hoskins (2017) has recently reported total 17,698 species of butterflies distributed in five zoogeographical regions, viz., Holarctic, Neotropical, Afrotropical, Oriental and Australian regions, and not reported from Antarctica regions. Total number of species so far reported from

India are 1,439 (Evans, 1932; Kunte, 2018) from oasis, high mountains, highlands, tropical to alpine forests, swamplands, plains, grasslands, and areas surrounding rivers.

Jammu and Kashmir known as 'Terrestrial Paradise on Earth' categorized to as a part of the Indian Himalayan State with a total forest cover of 8,128 km² (Singh and Bedi, 2017) and worldwide known for rich biological diversity. These regions encompasses a variety of habitats conducive to species of butterflies, and several published literatures available on butterflies fauna for J&K Union Territory and elsewhere in the country (Home, 1938; Moore, 1874; Lang, 1868; Bingham, 1907; Meinertzhagan, 1927; Talbot, 1947; Wynter-Blyth, 1957; Mani and Singh, 1962; Das *et al.*, 1964; Das and Verma, 1965; Tshikolovets, 2005; Uniyal, 2007; Khan *et al.*, 2011; Sidhu *et al.*, 2012; Qureshi, 2014; Sondhi *et al.*, 2017; Bhagat, 2017; Sharma and Sharma, 2018; Sheikh and Parrey, 2019).

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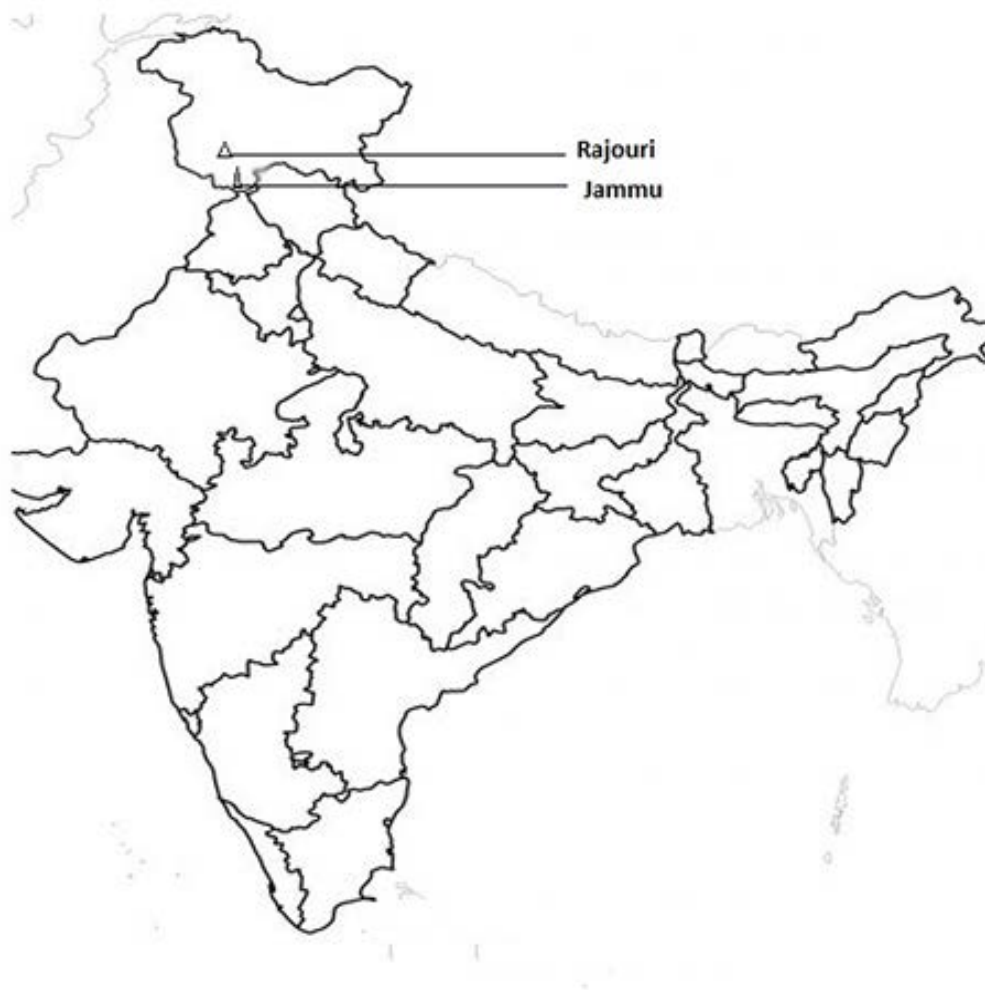
Material and Methods

Study Area

Jammu and Rajouri districts (Map 1) of J&K fall in Shivalik range and Pir Panjal range of Western Himalaya respectively. Jammu district lies at the latitudes of 32°44'59.99" N and the longitudes of and has a 74°49'59.99" E average elevation of 300m amsl. The average yearly precipitation is about 710mm. Rajouri district lies at the latitudes of 33°14'60.00" N and the longitudes of 74°14'60.00" E and has an average elevation of 915m amsl. The climate of Rajouri is somewhat cooler than the other surrounding plains. Summers are short and pleasant and summer temperature does not exceed 41 degrees. The average rainfall is 804mm.

Methodology

Several field tours were undertaken from 2014-2019 in different seasons for exploration and investigation to butterflies of Jammu and Rajouri district. While studying, visual encounter methods were employed at the morning hours from 7 am to 11 am, followed by complete photography of the specimens (Caldas and Robbins, 2003; Walpole and Sheldon, 1999). Focus were made to study ecological parameters associated with butterflies and their role in pollination biology. The samples were collected through insect collection net with telescopic handle and wire ring of 30 cm diameter. The specimens were killed by thoracic pinching (Evans method) and were kept in the Museum of Department of Zoology, BGSB University Rajouri (J&K). Live Photography of butterflies was



Map 1. Map of India Showing Jammu and Rajouri districts of J&K.

carried out by using Nikon DSLR 3500D field camera. The species identification and authentication were carried out by consulting the available literatures (Kunte, 2006; Pajni *et al.*, 2006; Singh, 2010; Gasse, 2013; Varshney and Smetacek, 2015; Kehimkar, 2014; 2016, Gasse, 2018).

Systematic Positions

Family RIODINIDAE

Subfamily NEMEOBINNAE

Abisara bifasciata Moore, 1877 (Figure 1)

Common name: Double Banded Judy

Salient characters: Upper side rich maroon-brown with blue gloss, underside dull maroon brown, forewing with transverse pale bands, hindwing with curved discal pal fascia. In male, upperside with rich purple-brown or maroon-brown with a blue gloss, whereas, in female, upperside hazel brown and terminal halves of wings pale.

Remarks: Individuals were noticed usually at the top of trees and amidst foliage nearby or on flowering twigs of *Justicia adhatoda* and *Lantana camara* at the elevation of 327 m amsl.

Imaging date: 15-X-2014.

Old distribution: India- Assam, Kerala, Maharashtra, Manipur, Mizoram and Tamil Nadu. This species is native to Asia (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (inside Raika environment Park, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Family PIERIDAE

Subfamily PIERINAE

Pareronia hippia Fabricius, 1787 (Figure 2)

Common name: Indian Wanderer

Salient characters: Male upper side ground colour with clear blue and forewing apex and terminal margin broadly black, while female upper side black with white bluish markings. The marginal markings prominent on upper hind wing in both sex.

Remarks: Individuals were observed flying over *Tecoma stans* and *Bauhinia vahlii* at the elevation range of 320-380 m amsl.

Imaging date: 04-VII-2016.

Old distribution: India- throughout India including present record from J&K and not reported from Punjab and Rajasthan. Global distribution restricted to Asia. (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (SKUAST-J Chatha).

IUCN threat status: Not yet worked out, also not included in catalogue of life.

Family NYMPHALIDAE

Subfamily SATYRINAE

Elymnias hypermnestra Linnaeus, 1763 (Figure 3)

Common name: Common Palmfly

Salient characters: Male has black upperside forewings with minute patches, forewing with a broad triangular pale purplish-white pre-apical mark, while, female upper side tawny, veins black, forewing dorsal margin broadly black.

Remarks: Individuals were recorded flying around *Murraya koenigii* and *Crinum sp.* flowering twigs at the elevation of 327 m amsl.

Imaging date: 17-X-2016.

Old distribution: India: Assam, Andhra Pradesh, Arunachal Pradesh, Chhatisgarh, Gujarat, Kerala, Maharashtra, Mizoram, Odhisa, Punjab, Sikkim, Tripura, Uttarakhand and West Bengal. Wide distribution recorded from South Asia. (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Raika Environment Park, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Subfamily HELICONIINAE

Acraea terpsicore Linnaeus, 1758 (Figure 4 & 5)

Common name: Tawny Coster

Salient characters: Upper side brick red or orange with narrow black boarder along outer wing edge on forewing; hind wing with black border and white spots. Male hind wing with a basal series of four or five black spots.

Remarks: Individuals were observed flying in grass and on flowers of *Bauhinia vahlii* and *Passiflora* species at the elevation range of 330-370 m amsl. Individuals were not noticed flying very high, but seems keep flying along the ground

Imaging date: 22-X-2015.

Old distribution: India: Arunachal Pradesh, Assam, Andhra Pradesh, Chhatisgarh, Delhi, Gujarat, Karnataka, Kerala, Manipur, Meghalaya, Rajasthan, Shimla, Sikkim, Telangana, Tripura, Uttar Pradesh and West Bengal. Wide distribution reported mainly from Southeast Asia. (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Manda hills, Jammu).

IUCN threat status: Not yet worked out, also not included in catalogue of life.

Subfamily CHARAXINAE

Charaxes solon Fabricius, 1793

Common name: Black Rajah (Figure 6)

Salient characters: Underside silvery grey, narrow wavy black lines with sub marginal and marginal yellowish green spots and crescents on under hind wing.

Remarks: Individuals were observed flying and mud puddling in and around the flowers of *Ageratum conyzoides* and *Lantana camara* along the shore of river near to the forest area between the elevation ranges of 320-360 m amsl.

Imaging date: 17-VIII-2017.

Old distribution: India: Andhra Pradesh, Assam, Delhi, Goa, Gujarat, Himachal Pradesh, Kerala, Madhya Pradesh, Rajasthan, Sikkim, Tamil Nadu, Telangana and West Bengal. Wide distribution reported from Southeast Asia (Sri Lanka and Bangladesh). (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (near Mansar Lake, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Subfamily LIMENITIDINAE

Athyma cama Moore, 1857 (Figure 11)

Common name: Himalayan orange staff sergeant

Salient features: Upperside brown; a broad white band and orange band is just behind to it in case of male. Female having orange bands on upper side and is brown in colour.

Remarks: Individual was noticed perching on *Berberis lycium* and *Pyrus pashia* at an elevation of 915m above sea level.

Imaging date: 17-IX-2018

Old distribution: Uttarakhand to Northeast India, Global distribution restricted to Asia (Bhutan, Nepal). (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Sunderbani, Rajouri).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Symphaedra nais Forster, 1771

Common name: Baronet (Figure 7 & 8)

Salient characters: The specimen with upper side tawny yellow, forewing with transverse black line below apical apex, with oval spot beyond encircling small yellow spot and termen shaded with black; hindwing post discal evenly curved series of spots and forewing base shaded with fuscous black, two spots at base of cell and a transverse line beyond crimson pink, edged marked with black.

Remarks: Individuals were recorded mud puddling nearby *Diospyros species*, *Bauhinia variegata* and *Lantana camara* flowering twigs between the elevation ranges of 320-330 m amsl.

Imaging date: 13-VIII-2016.

Old distribution: India: Andhra Pradesh, Chhatisgarh, Delhi, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Rajasthan, Sikkim, Telangana, Tamil Nadu, Uttarakhand and West Bengal. Wide distribution



Fig. 1



Fig. 2



Fig. 3



Fig. 4

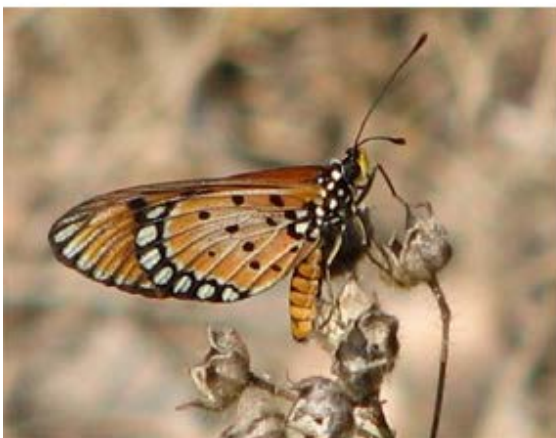


Fig. 5



Fig. 6

Figures 1-6. 1. *Abisara bifasciata* Moore, 1877. 2. *Pareronia hippia* Fabricius, 1787. 3. *Elymnias hypermnestra* Linnaeus, 1763. 4&5. *Acraea terpsicore* Linnaeus, 1758. 6. *Charaxes solon* Fabricius, 1793.

reported from South India and Sri Lanka. (Varshney & Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Raika Environment Park, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Subfamily LIMENITIDINAE

Neptis jumbah Moore, 1858 (Figure 9)

Common name: Chestnut Streaked Sailer

Salient characters: In male, upper side fuliginous black spots. In female, the spots on forewing and hind wings comparatively broader than male, central white band on upper hind wing broad, row of white spots reduced near upper hind wing outer edge and dark chestnut streak beyond under forewing cell. *Remarks:* Individuals were observed perching flowers and matured fruits of *Lantana camara* at the elevation of 327m above sea level.

Imaging date: 17-X-2017.

Old distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Chhatisgarh, Gujarat, Jharkhand, J&K (present), Kerala, Karnataka, Madhya Pradesh, Meghalaya, Odhisa, Tripura, Sikkim and West Bengal. Endemic to South Asia (Myanmar and Sri Lanka). (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Manda hills, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Moduza procris Cramer, 1777 (Figure 10)

Common name: Commander

Salient characters: The upper side of their wings bright reddish brown and centre of wings with white spots, hind wings with crenulated margins and underside whitish grey towards the base and row of dull reddish brown or black spot along the margins.

Remarks: Individuals were observed having swift flight nearby forest areas, open glades and roadsides. The Commander spotted basking with their wings pressed

flat on rocks along streambeds. Flowering twigs of *Acacia catechu*, *Mussaendra frondosa*, *Mitragyna parviflora*, *Acacia modesta*, *Cannabis sativa* and *Lantana camara* between the elevation ranges of 320 m and 500 m amsl.

Imaging date: 15-IX-2014.

Old distribution: India: Arunachal Pradesh, Assam, Chhatisgarh, Gujarat, Jharkhand, Kerala, Madhya Pradesh, Meghalaya, Odhisa, Sikkim, Tamil Nadu, Tripura, Uttarakhand and West Bengal. Native of South Asia (Myanmar, Bangladesh and Sri Lanka). (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; ondh and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Raika Environment Park, Jammu).

IUCN threat status: Not yet worked out, also not included in catalogue of life.

Family LYCAENIDAE

Subfamily THECLINAE

Tajuria jehana Moore, 1884 (Figure 12)

Common name: Plains Blue Royal.

Salient characters: Upperside white with black lines in series on upper hindwings, two tornal spots at the base of tail and blue area on fore-wing above.

Remarks: Individuals were observed perching over *Murraya koenigii* and *Todalia* trees between the elevation ranges of 320-350 m amsl.

Imaging date: 9-XI- 2015.

Old distribution: India: Assam, Bihar, Chhatisgarh, Garhwal, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Shimla, Tamil Nadu, Telangana, Uttarakhand, Uttar Pradesh and West Bengal. Global distribution restricted to Asia (Sri Lanka, China and Nepal). (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Raika Environment Park, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12

Figures 7-12. *Symphaedra nais* Forster, 1771 **9.** *Neptis jumbah* Moore, 1858. **10.** *Moduza procris* Cramer, 1777. **11.** *Athyma cama* Moore, 1857. **12.** *Tajuria jehana* Moore, 1884.

Arhopala amantes Hewitson, 1862 (Figure 13 & 14)

Common name: Large Oakblue

Salient characters: Underside hind wing squarish spots in spaces 4 and 5 at right angles, metallic blue markings on its upper side. In the female, the blue scales restricted to the centre and basal portion of both wings and outer margins marked by wide black band.

Remarks: Individuals were observed in lower canopy of small trees and noticed flying over *Lantana camara*, *Syzygium cuminii* and *Tecoma stans* between the elevation ranges of 325-370 m amsl.

Imaging date: 22-VI-2015.

Old distribution: India: Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Odhisa and Rajasthan. Global distribution restricted to Asia (Sri Lanka). (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Mahamaya forest, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Subfamily POLYOMMATINAE

Jamides celeno Cramer, 1775 (Figure 15)

Common name: Common Cerulean

Salient characters: Underside with white lines on greyish brown background, tornal spot present at the base of tail. Male upper side with ground colour pale bluish white, whereas female with upper side with greater area of white to be seen between brown markings.

Remarks: Individuals were observed perching over *Bauhinia vahlii* flowers between the elevation range of 325-340 m amsl.

Imaging date: 12-VI-2016.

Old distribution: India: Andhra Pradesh, Assam, Goa, Gujarat, Himachal Pradesh, Kerala, Meghalaya, Maharashtra, Tripura, Telangana, Uttarakhand and West Bengal. This species is endemic to Southeast Asia. (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (Mahamaya forest, Jammu).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Everes lacturnus Godart, 1824 (Figure 16)

Common name: Indian cupid

Salient features: Underside is pale silvery-grey, with a bright reddish orange blotch at the hindwing tornus, and series of dark grey marginal and submarginal dashes.

Remarks: Individuals were found nectaring on *Trifolium* species and perching over grass at an elevation of 915m amsl.

Imaging date: 20-IV-2019.

Old distribution: In India: Himachal Pradesh to Northeast India, Uttar Pradesh and Bihar. Global distribution reported from Sri Lanka to Malaysia, Southern China, South Korea, Japan, Thailand, Australia. (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (BGSB University, Rajouri).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.

Family HESPERRIIDAE

Subfamily HESPERRINAE

Udaspes folus Cramer 1775 (Figure 17 & 18)

Common name: Grass demon

Salient features: Upperside black, the basal half of both the wings covered with minute yellow scales, markings pure white. Fore wing with large white spot. Hind wing with a very large medial white patch with its margin sinuous all around; abdominal area covered with yellow hair. Upper side fore wing with markings and hind wing with white medial patch.

Remarks: Individual was found on grass at an elevation of 915m amsl.

Imaging date: 16-V-2018.

Old distribution: Gujarat to West Bengal and south to Kerala, Himachal Pradesh to Northeast India. Global Distribution Sri Lanka Myanmar, China, Indochina,

Taiwan, Thailand, Singapore, Indonesia. (Varshney and Smetacek, 2015; Kehimkar, 2014, 2016; Paul Van Gasse, 2018; Sondhi and Kunte, 2018; Kunte *et al.*, 2018).

New distribution: J&K (BGSB University, Rajouri).

IUCN threat status: Not yet worked out, but the species included in catalogue of life.



Fig. 13



Fig. 14



Fig. 15



Fig. 16



Fig. 17



Fig. 18

Figures 13-14. *Arhopala amantes* Hewitson, 1862. **15.** *Jamides celeno* Cramer, 1775. **16.** *Everes lacturnus* Godart, 1824. **17&18.** *Udaspes folus* Cramer 1775.

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