



E-ISSN: 2320-7078

P-ISSN: 2349-6800

www.entomoljournal.com

JEZS 2020; 8(3): 707-713

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Received: 16-03-2020

Accepted: 18-04-2020

Jagbir Singh Kirti

Department of Zoology &
Environmental sciences, Punjabi
University, Patiala, Punjab,
India

Manpreet Kaur

Department of Zoology &
Environmental sciences, Punjabi
University, Patiala, Punjab,
India

Avtar Kaur Sidhu

High Altitude Regional Centre,
Zoological Survey of India,
Sapruon, Solan, Himachal
Pradesh, India

Navneet Singh

Zoological Survey of India, Prani
Vigyan Bhawan, New Alipore,
Kolkata, West Bengal, India

Corresponding Author:**Jagbir Singh Kirti**

Department of Zoology &
Environmental sciences, Punjabi
University, Patiala, Punjab,
India

Taxonomic study of the genus *Prioneris* Hubner (Lepidoptera: Pieridae) from India

Jagbir Singh Kirti, Manpreet Kaur, Avtar Kaur Sidhu and Navneet Singh

Abstract

In the present manuscript, two species of genus *Prioneris* Hubner i.e., *Prioneris thestylis* (Doubleday) and *Prioneris sita* (Felder) have been treated taxonomically from India. Besides studying morphological characters, their male and female genitalia have been described in details and illustrated for the first time. The diagnosis of the genus and key to species has been updated using genitalic attributes. In the species *P. thestylis* the dry season form and wet seasons forms have been studied and the differences in their genitalia compared.

Keywords: *P. thestylis*, *P. sita*, dry season form, wet season form, male genitalia, female genitalia

Introduction

Wallace (1867) [5] erected the genus *Prioneris* with type species *Pieris thestylis* Doubleday collected from North India. The genus *Prioneris* contains six species, all endemic to Indo-Malayan region and out of these, three species i.e. *Prioneris philonome* (Boisduval), *Prioneris thestylis* (Doubleday) and *Prioneris sita* (Felder) have been recorded from India. The representatives of the genus *Prioneris* has been recorded to mimic the members of the genus *Delias* with both these genera representing mullerian mimicry and both genera are unpalatable to predators Canfield and Pierce (2010) [1]. Talbot (1939) [4] also described the resemblances between *Prioneris sita* (Felder) and *Delias eucharis* (Drury). Klots (1931) [3] described the genitalia of genus *Prioneris* in brief. In the present studies two species viz., *Prioneris thestylis* (type-species) and *Prioneris sita* have been dealt with taxonomically. Besides studying morphological characters, their male and female genitalia have been described in details and illustrated for the first time. The diagnosis of the genus and key to species have been updated using genitalic attributes.

Observations and Discussion

Genus *Prioneris* Wallace, 1867

Common name: Sawtooths

Prioneris Wallace, 1867; Trans. ent. Soc. Lond. 4: 383.

Prioneris Moore, 1881; Lepid. Ceylon 1: 140.

Prioneris Winhard, 2000; Butterflies of the World 10: 16.

Type species: *Pieris thestylis* Doubleday, 1842

Pieris thestylis Doubleday, 1842; Zool. Misc.: 76.

Diagnosis: Forewing vein M_1 stalked from veins R_{4+5} ; aedeagus with distal part of suprazone serrated; uncus in lateral view narrow, arched, curved downwardly, dorsally Y-shaped; valve with narrow, blunt apex; juxta conical with narrow arms.

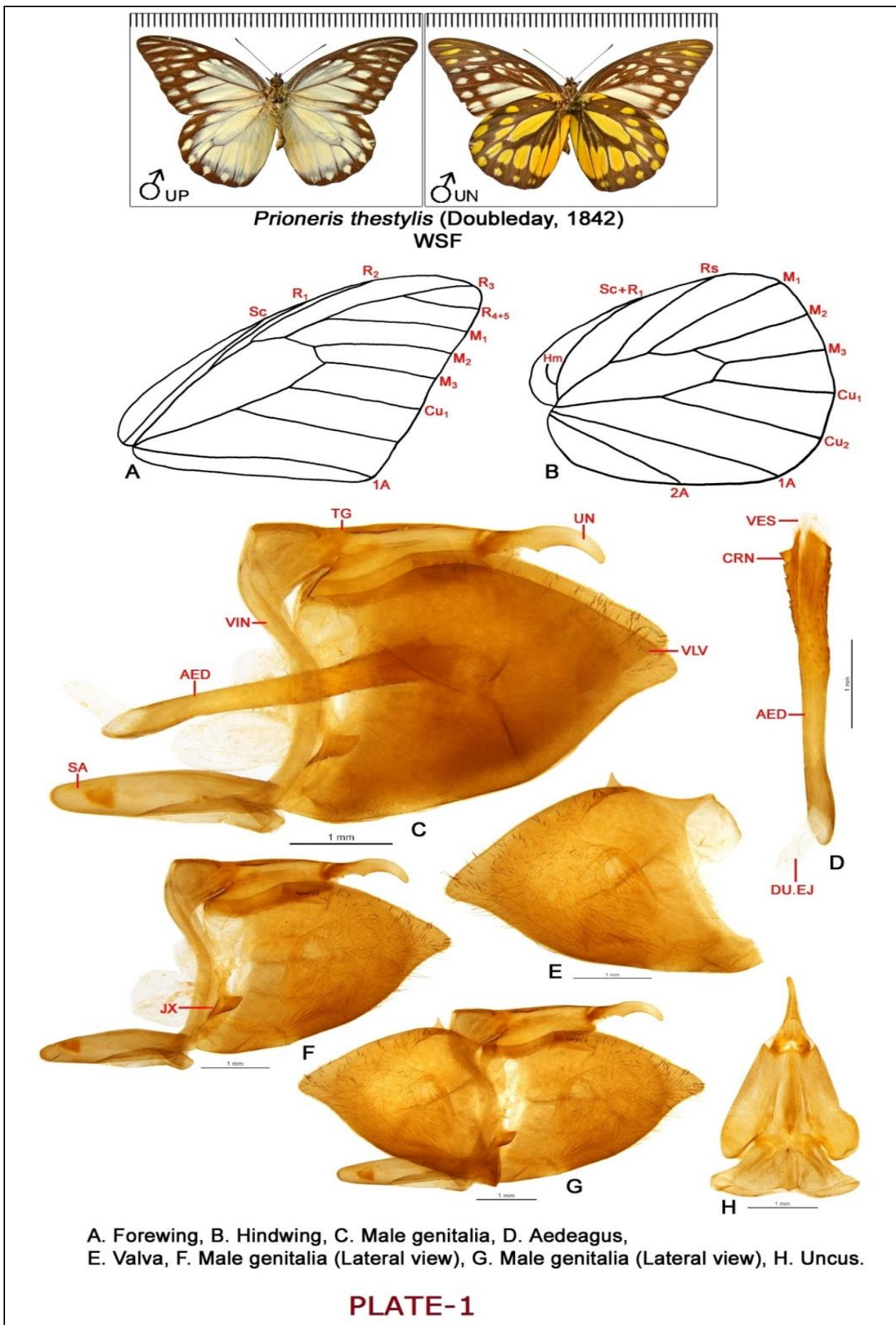
Key to the species of the genus *Prioneris*:

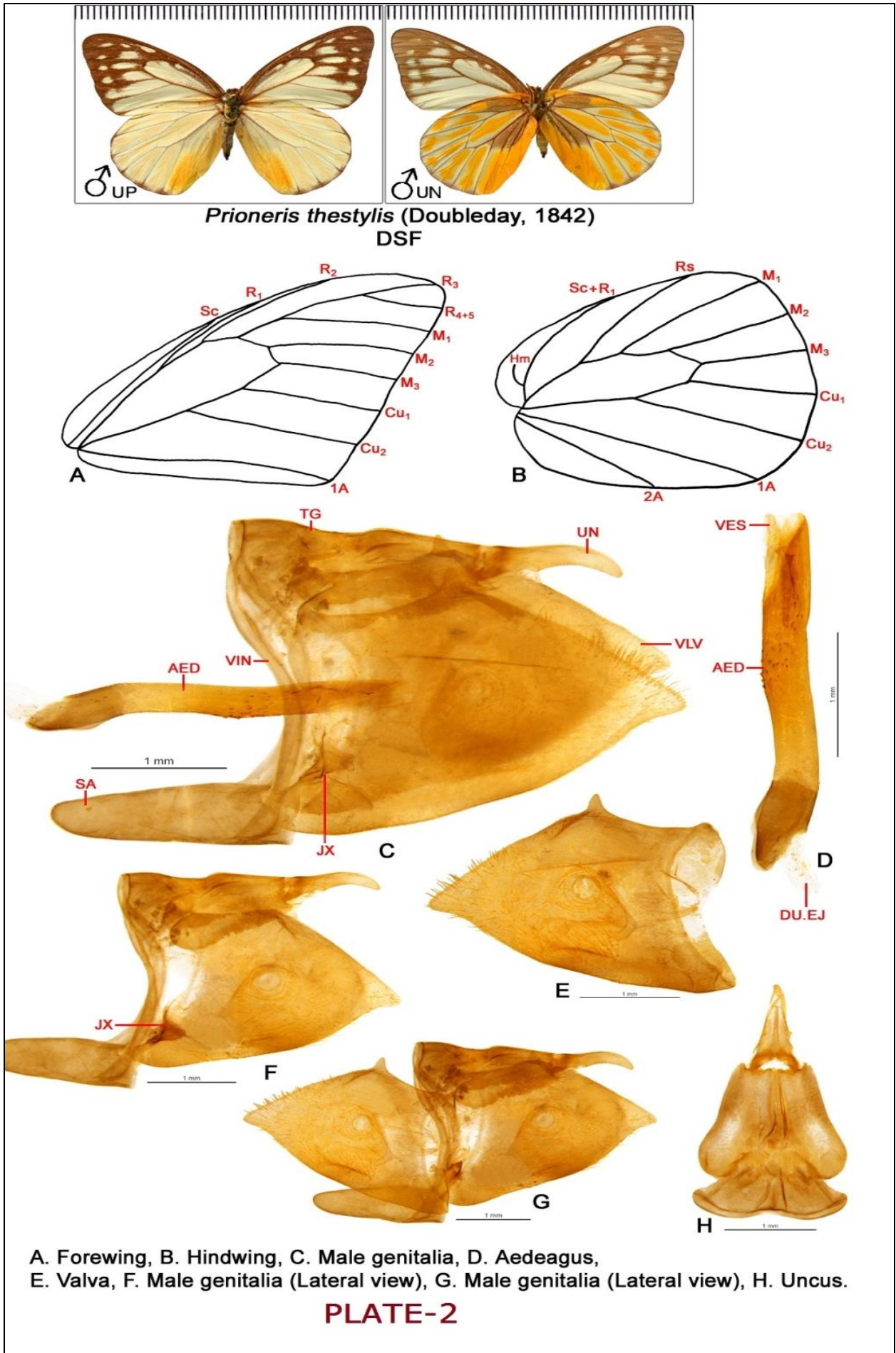
- Hindwing ventral side with yellow spots on marginal border; aedeagus almost straight; tegumen narrow in dorsal view.....*thestylis* Doubleday
Hindwing ventral side with red spots on marginal border; aedeagus with proximal part of suprazone arched; tegumen broad in dorsal view.....*sita* Felder

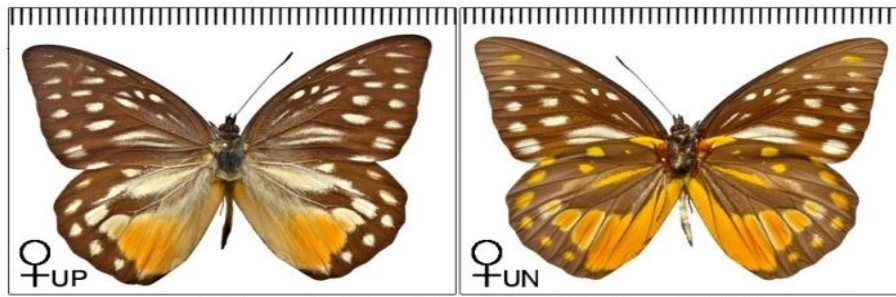
***Prioneris thestylis* (Doubleday, 1842)**

Common name: Spotted Sawtooth

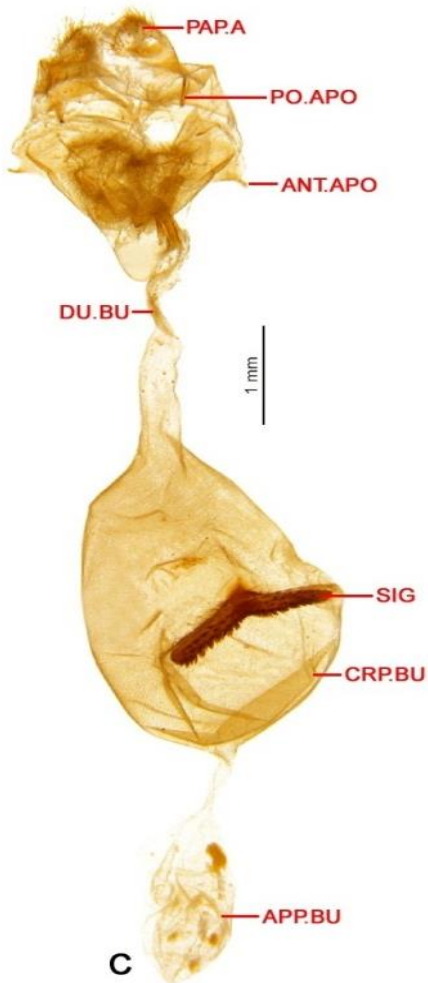
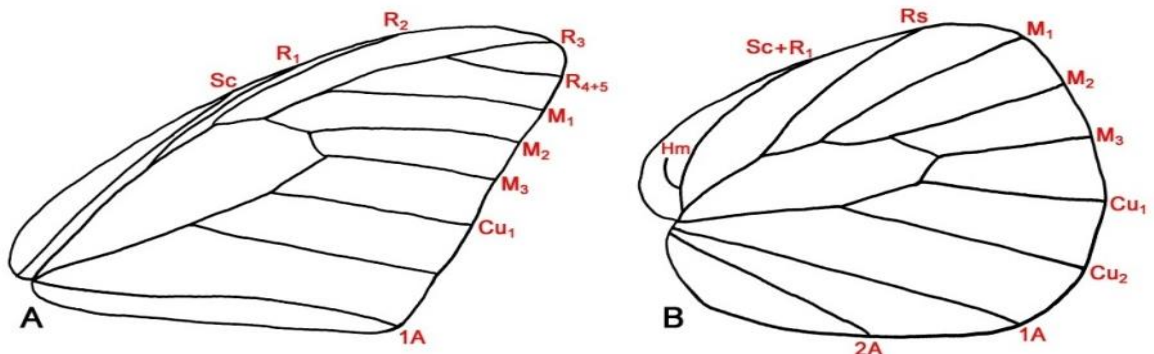
(PLATES: 1-3)







Prioneris thestylis (Doubleday, 1842)
WSF



A. Forewing, B. Hindwing, C. Female genitalia, D. Papilla Analis

PLATE-3

Pieris thestylis Doubleday, 1842; Zool. Misc.: 76.
Prioneris thestylis f. *fumie* Sonan, 1931; *Zephyrus* 3: 197.

Adult (Male WSF, Plate-1): Forewing dorsal surface whitish blue; costa, apex and termen blackish; broadly black anterior veins; three white elongated stripes on the apex; 4 to 5 marginal spots of ground of ground color; post-discal spots in areas M_3 to R_2 ; cell lined by dark black; tornus with ground color spot. Ventral surface maculation more darker; yellow apical streaks and submarginal dots in areas M_1 to R_2 . Hindwing dorsal surface white; blackish veins widen on the outer margin. Ventral surface brownish-black with yellow spots; cell yellow; 7 yellow post-discal spots; submarginal yellow seven spots; inner margin yellowish.

Adult (Male DSF, Plate-2): Smaller form. Both the wings with more broader white markings and restricted black area. Forewing ventral side black markings broader. Hindwing dorsal surface little yellow with yellow dorsum. Ventral side with broader yellow markings; cell with broad yellow stripe.

Adult (Female, Plate-3): Forewing dorsal surface dark brown; 5 to 6 white large post-discal spots; white elongated large submarginal spots; four white spots in the cell; two parallel white stripes in area Cu_2 . Ventral surface brown; markings smaller; apical spots yellowish. Hindwing dorsal surface dark brown; white heart-shaped submarginal spots; white stripe in cell; 2 to 3 white discal spots; inner margin widely mustard yellow. Ventral surface dark brownish with yellow maculation, mustard yellow submarginal spots; mustard yellow thin stripe in the cell; 3 yellow discal spots; inner margin mustard yellow.

Wing expanse: 85-90mm.

Male Genitalia (DSF): Uncus tube-like, more than half of the distal part weakly arched, tip blunt, downcurved, in dorsal view V-shaped, much narrower than tegumen; tegumen sclerotized; vinculum narrow, sclerotized, concave; saccus tubular; juxta cone-shaped, well sclerotized; valva broad, costa concave at the base and then protrudes upwards to form a mid-dorsal spine-like process, apex blunt, slightly downcurved; aedeagus slightly curved, suprazone less serrated, subzone much smaller than suprazone, ductus ejaculatorious enters dorsally.

WSF: Uncus narrow and more than half of the distal part strongly arched; aedeagus almost straight with variable width, half of the suprazone serrated.

Female Genitalia: Corpus bursae balloon-shaped, signum long, narrow, sclerotized, V-shaped without long arms; appendix bursae narrow, oval-shaped; ductus bursae slightly broad; papilla analis pilosed; posterior apophysis longer and more sclerotized than anterior apophysis; genital plate bilobed, each lobe sac-like, inner membrane hairy.

Material examined: 1♂, 9.iii.1961, 3♂, 23.x.1961, Amatulla village, Kameng; 1♂, 28.v.1961, two miles north of Bokhar, Kameng; 1♂, 12.i.1962, 1♂, 17.i.1962, 1♂, 20.i.1962, Tirap, (Coll. C.B.Srivastava); 1♂, 4.v.1966, 2♂, 6.v.1966, Pinguli, Kameng, (Coll. A.N.T. Joseph); 1♂, 17.v.1966, Pamir, (Coll. A.N.T. Joseph); 1♂, 22.v.1966, Subansiri division, Chukru, (Coll. A.N.T. Joseph); 1♂, 10.xii.1969, Tihun, (Coll. J.M. Julka); 1♂, 17.xii.1969, Kamlang river, (Coll. J.M. Julka); 12♂, Sikkim; 2♂, Kurseong; 1♂, Shillong;

Distribution India: Arunachal Pradesh, Mizoram, Manipur, Assam, Nagaland and Meghalaya.

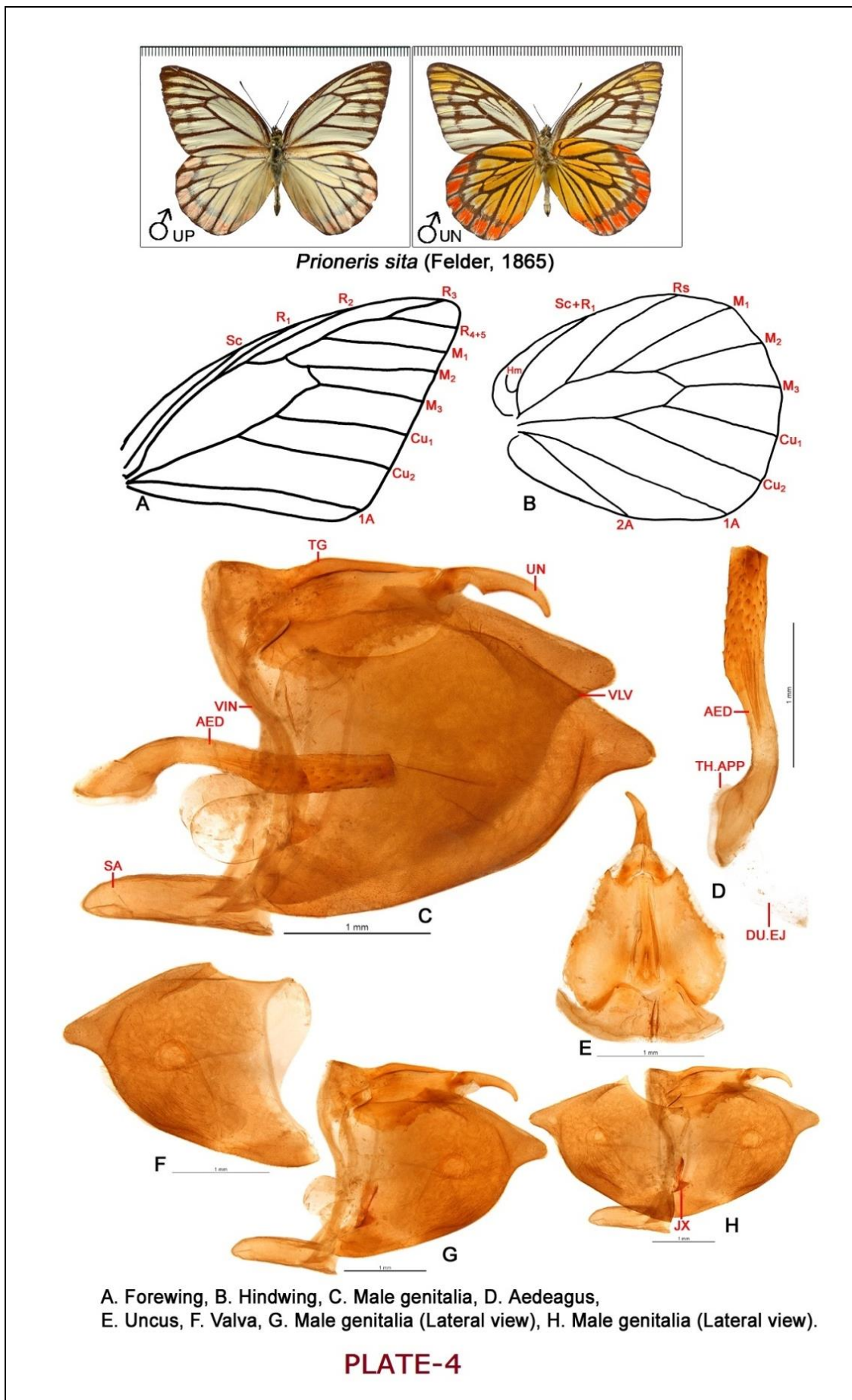
Elsewhere: Nepal, Burma, Taiwan, Hainan and Peninsular Malaya.

Remarks: *Prioneris thestylis* (Doubleday) has been reported to inhabit hot open habitats and flies at the altitude of about 500-1200m (Talbot, 1939) [4]. Wallace (1867) [5] observed the similarities between the species belonging to genus *Prioneris* and *Delias*. He discussed the resemblance of *Prioneris thestylis* (Doubleday) with *Delias belladonna* (Fabricius). Canfield and Pierce (2010) [1] observed the mimetic relationship between the WSF of *Prioneris thestylis* and *Delias belladonna*. In this present work, the morphological and genitalic attributes of WSF and DSF of *Prioneris thestylis* have been studied, illustrated and compared for the first time. The WSF of *Prioneris thestylis* is white dorsally with black markings. Ventrally the forewing is white with yellow apex and hindwing is yellow with black markings. Whereas in DSF these black markings are much reduced. In WSF of *P. thestylis*, the uncus is slightly broad, more than half of the distal part is arched and the aedeagus is narrow whereas in DSF, the uncus is slightly narrow, more than half of the distal part weakly arched and the aedeagus is broad.

***Prioneris sita* (Felder, 1865)**

Common name: Painted Sawtooth

(PLATE - 4)



Pieris sita Felder, 1865; Reise Fregatte Novara, Bd 2: 161.

Prioneris sita Moore, 1881; Lepid. Ceylon 1: 141.

Prioneris sita Winhard, 2000; Butterflies of the World 10: 16.

Adult (Male, Plate-4): Forewing dorsal surface white; veins thin dark black; termen thin, blackish with denticulate border; dorsum little curved. Ventral surface white; costa blackish; apex dusted with yellow; veins dark black and does not widen at the border; post-discal black bar arising from vein Cu_2 and reaches upto vein R_{4+5} . Hindwing dorsal surface white, underneath markings visible through on ventral surface. Ventral surface mustard yellow upto black post-discal bar, red marginal spots separated by black veins.

Wing expanse: 75-90mm.

Male Genitalia: Uncus narrow, arched notched at base, distal tip blunt, strongly downcurved; tegumen longer than uncus, sclerotized; vinculum narrow, incurved; saccus elongated; juxta cone-shaped with upper arms of the cone long; valve broad, costa concave at the base and then inclined towards apex, apical tip produced to form blunt end, slightly downcurved; aedeagus sclerotized, subzone smaller than supra zone, suprazone curved near subzone and then runs straight towards apical portion, more than half of the suprazone is serrated, ductus ejaculatorious dorsad.

Material examined: 1♂, 1.x.1880, 1♂, 24.xi.1880, Berkadi, South India; 1♂, i.1913, 1♂, 30.iii.1923, 5♂, Coorg, South India; 1♂, iii, Nilgiri; 1♂, Trivandrum.

Distribution India: Karnataka, Kerala and Tamil Nadu.

Elsewhere: Sri Lanka.

Remarks: *Prioneris sita* (Felder) is protected under Schedule IV of the Wildlife (Protection) Act, 1972. This species is found rare in the states of South India and Sri Lanka. Fraser (1930)^[2] and Talbot (1939)^[4] explained the mimicry between *Prioneris sita* and *Delias eucharis* (Drury). Both exhibit extraordinary resemblance. In the present studies the genitalia of *P. sita* is studied, illustrated and compared with the genitalia of *P. thestylis* for the first time. In *P. sita*, the dorsal margin of the uncus is smoothly inclined downwards, tegumen broad, aedeagus with proximal part of suprazone strongly arched and distal part straight whereas in *P. thestylis*, the dorsal margin of the uncus is humped, tegumen narrow and the aedeagus is straight.

Acknowledgements: The authors are thankful to Director, Zoological Survey of India for giving access to study collections housed at Zoological Survey of India, Kolkata.

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