TAXONOMIC STUDIES ON GENUS *SPLARCTIA* BUTLER (ARCTIINAE: ARCTIIDAE: LEPIDOPTERA) FROM INDIA

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**ABSTRACT**

The morphological characters of the external genitalia of eight Indian species of genus *Spilarctia* Butler have been studied and illustrated. The paper gives the distribution of these species. A key to the Indian species of this genus is also given.

**KEYWORDS**

Arctiidae, genitalia, key, Lepidoptera, *Spilarctia*, taxonomy

**ABBREVIATIONS**

ACC.SC - Accessory sac; AED - Aedeagus; ANTAPO - Anterior apophyses; CO - Costa; CRN - Cornutri; CRPB - Corpus bursae; DUBU - Ductus bursae; DU.EJ - Ductus ejaculatoris; JX - Juxta; PAP.A - Papilla analis; PO.APO - Posterior apophyses; SA - Sacculus; SL - Sacculus; TO - Tegumen; TRA - Transtilla; UN - Uncus; VES - Vesica; VIN - Vinculum; VLV - Valvula

The genus *Spilarctia* Butler was erected on the type species *Phalaena lutea* Hufnagel. Hampson (1894) synonymised the genus *Spilarctia* under genus *Spilosoma* Stephens and later on placed both these genera under *Diacrisia* Hübner (Hampson, 1901). Seitz (1910) while introducing the division of Arctiinae into Spilosominae, Micrarctiinae, and Spilarctiinae, separated some of the old world species placed in the genus *Diacrisia* Hübner (Hampson, 1901) into *Spilarctia*, and treated *Diacrisia* under subfamily Arctiinae. Watson *et al.* (1980) listed all these three genera i.e., *Spilarctia*, *Spilosoma* and *Diacrisia* as valid generic names with *lutea* Hufnagel, *mensthastr* Denis & Shiffermuller and *ruscula* Linnaeus as their type species. Koda (1988) studied the male and female genitalic structures of these type species.

In the present study sixty six individuals of tiger moths belonging to eight species viz., *erthrozona* (Kollar), *leopardina* (Kollar), *casigneta* (Kollar), *irregularis* (Rothschild), *rubilinea* (Moore), *comma* (Walker), *niceta* (Stoll) and *obliqua* (Walker) under genus *Spilarctia* Butler (Hampson, 1894, 1901; Arora & Chaudhury, 1982; Holloway, 1988; Koda, 1987, 1988; Fang 2000) were collected from different localities of Assam, Himachal Pradesh, Jammu & Kashmir, Nagaland Punjab, Sikkim, Uttarakhand and West Bengal. These species were identified on the basis of taxonomically important features such as labial palpi, wing venation and maculation and comparisons with the identified collections of the National Museums. Besides this, the male and female genitalic characters have also been studied and illustrated in detail. The terminology by Klots (1970) has been followed for naming different parts of the genitalia. The critical examination of these taxonomic features revealed that all these species completely conform to the characterization of the type species of genus *Spilarctia* and are congeneric. In addition to the above five more species of genus *Spilarctia* was also studied from the *multiguttata* complex (Kaleka, 2005). A key to the

*Spilarctia* Butler, 1875


*Spilarctia erthrozona* (Kollar)

(Figs. 1-4)


Type locality: Kashmir

Male genitalia: Uncus of moderate size, broad, triangular, tip blunt and curved, dorsally setosed; acrotergite large; fenestra absent; tegumen of moderate size, slightly longer than vinculum; vinculum U-shaped; saccular reduced. Valva short and broad; saccular margin with a distinct finger like projection; distal end hammer-shaped; juxta well developed, trapezoid, apical margin emarginated; translarena prominent. Aedeagus with anterior tip rounded, both of its walls equally sclerotized; distal half with a sclerotized shield like structure, beset

![Image](image-url)

**Figures 1-4. Male genitalia of Spilarctia erthrozona (Kollar)**

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with spines; vesica armed with large number of densely packed spines at distal end and denticles.  

Wing expanse (half): Male: 19mm; Female: Not examined  

Distribution: India: North West Himalayas; Elsewhere: China.

**Spilarctia leopardina** (Kollar)  
(Figs. 5-9)  
Type locality: North West Himalayas.  

Male genitalia: Uncus of moderate size, curved ventrally, setosed, tip blunt; acrotergite well developed; fenestralia absent; tegumen almost double length of vinculum; vinculum U-shaped; saccus reduced. Valva simple; sacculus and costa not well defined; saccular margin with a double length of vinculum; vinculum U-shaped, well sclerotized; saccus reduced. Valva simple, moderately long and narrow, saccus and costa well defined; saccus with a distinct projection above middle of valva; ocellus and valvula fused to form a distal hammer-shaped projection; juxta large, clypeiform, emarginated at apex, having bifid appearance; transtilla long, sclerotized and bar like. Aedeagus long, tip rounded, both of its walls equally sclerotized; a distinct sclerotized shield attached on distal end of aedeagus, bearing many small and three prominent spines, vesica armed with congregations of small denticles and spines below middle and at distal end.  

Female genitalia: Corpus bursae rounded, membranous, signum absent; ductus bursae long, anterior half narrow and membranous, posterior half broad, coiled and highly sclerotized; anterior apophyses short, broad at base, apices pointed, posterior ones long, with their apices blunt; papilla analis triangular and rounded, clothed with many small and few large setae. (Illustrated by Kirti & Singh 1994.)  
Wing expanse (half): Male: 20-22mm; Female: 21-25mm  
Distribution: India: North West Himalayas, Sikkim; Elsewhere: China.

**Spilarctia casigneta** (Kollar)  
*Euprepia casigneta* Kollar, 1844, in Hugel's Kaschmir und das Reich der Siek, 4(2): 469; Hampson, 1894, Moths Ind. 2: 9; id., 1901, Cat. Lep. Phal. 3: 281; Kirby, 1892, Cat. Het. 1: 231.  
Type locality: Kashmir.  

Male genitalia: Uncus short, broad, triangular, tip blunt, dorsally setosed, with a central slight hood like structure at tip; large acrotergite present; fenestralia absent; tegumen with outer wall straight, inner wall convex, longer than vinculum; vinculum U-shaped, well sclerotized; saccus reduced. Valva simple, moderately long and narrow, saccus and costa well defined; saccus with a distinct projection above middle of valva; ocellus and valvula fused to form a distal hammer-shaped projection; juxta large, clypeiform, emarginated at apex, having bifid appearance; transtilla long, sclerotized and bar like. Aedeagus long, tip rounded, both of its walls equally sclerotized; a distinct sclerotized shield attached on distal end of aedeagus, bearing many small and three prominent spines, vesica armed with congregations of small denticles and spines below middle and at distal end.  

Female genitalia: Corpus bursae rounded, membranous, signum absent; ductus bursae long, anterior half narrow and membranous, posterior half broad, coiled and highly sclerotized; anterior apophyses short, broad at base, apices pointed, posterior ones long, with their apices blunt; papilla analis triangular and rounded, clothed with many small and few large setae. (Illustrated by Kirti & Singh 1994.)  
Wing expanse (half): Male: 20-22mm; Female: 21-25mm  
Distribution: India: North West Himalayas, Sikkim; Elsewhere: China.

**Spilarctia irregularis** (Rothschild)  
(Figs. 10-13)  
Type locality: China.  

Male genitalia: Uncus triangular, broad at base, curved ventrally towards distal end, tip blunt, dorsally setosed; acrotergite well developed; fenestralia absent; tegumen well sclerotized, almost double length of vinculum; vinculum U-shaped; saccus reduced. Valva...
simple; sacculus distinct; costa narrow, triangular projection near distal end; distal end bifid; juxta trapezoid, apical margin emarginated; transstilla not defined. Aedeagus long, semi-sclerotized, with two small patches in middle; vesica armed with prominent spines and denticles.

Wing expanse (half): Male: 22mm; Female: Not examined

Distribution: India: Assam, Himachal Pradesh, Sikkim, Meghalaya; Elsewhere: China, Myanmar.

Spilarctia rubilinea (Moore)  
(Figs. 14-18)


Material examined: 1 male, 07.vii.1991, Solan, Himachal Pradesh, 1340m; 1 female, 16.i.x.1994, Zunheboto, Nagaland, 1570m. 3 males, 13.v.1995, Lachen, Sikkim, 2970m; 1 male, 07.v.1995, Mangan, 1200m; 1 female, 20.i.x.1995, Kempty falls, Uttarakhand, 1524m. 1 male, 01.v.1995, Jorebunglow, West Bengal, 1753m.

Type locality: Sikkim.

Male genitalia: Uncus of moderate size, swollen at base, lateral walls slightly produced outwards, curved ventrally, setosed with fine setae on dorsal side, tip blunt; acrotergite covering lower half of uncus; fenestrua absent; tegumen well developed, slightly shorter than vinculum; vinculum U-shaped; saccus reduced. Valva simple and narrow; sacculus distinct; costa narrow; sacculus margin produced near distal end; bifid at tip and setosed; juxta saucer shaped, apical margin emarginated; transstilla prominent. Aedeagus moderately long, anterior tip rounded; distal end bifid; juxta trapezoid, apical margin emarginated; transstilla well developed. Aedeagus long, anterior tip broad, both of its walls equally sclerotized; a sclerotized plate with denticulate margin present at distal end; vesica armed with prominent spines and a large number of denticles.

Female genitalia: Corpus bursae rounded, membranous; signum wanting; ductus bursae highly sclerotized; accessory sac present; anterior apophyses slightly less than half length of posterior ones, apices rounded; papilla analis broad and rounded, fringed with micro and macro setae.

Wing expanse (half): Male: 21-25mm; Female: 24-28mm

Distribution: India: Assam, Himachal Pradesh, Sikkim, Meghalaya; Uttaranchal, West Bengal; Elsewhere: China and Myanmar.

Spilarctia comma (Walker)  
(Fig. 19)

Spilarctia comma (Walker)  
(Fig. 19)

Spilarctia obliqua (Walker)


Material examined: 1 male, 06.06.1994, Manali, Himachal Pradesh, 2050m. 1 male, 15.vi.1994, Chakrata, Uttarakhand, 2100m; 1 female, 13.x.1991, Mussorie, 2030mm; 1 female, 02.vii.1994, Ranikhet, 1830mm.

Type locality: N. W. Himalayas.


Female genitalia: Corpus bursae circular, membranous; ductus bursae long, well sclerotized; anterior apophyses less than half length of posterior ones, anterior apophyses with apices narrow; papilla analis broad and rounded, fringed with fine setae.

Wing expanse (half): Male: 23-25mm; Female: 25mm

Distribution: India: N. W. Himalayas; Elsewhere: China, Myanmar.
Key to the species of genus *Spilarctia* Butler

1. Forewing with limited black spots; abdomen decorated with crimson scales; valva of male genitalia with gradually broadening towards distal end.................................................................12

2. Forewing with numerous series of black spots; abdomen decorated with yellow scales; valva of male genitalia with lower two-third portion broad, distal portion narrow.................................................................................................9

3. Labial palpus clothed with black scales on sides and underside....................................................................................3

4. Labial palpus streaked with crimson scales on sides, underside fringed with yellow scales..............................7

5. Wings with ground colour white, no antemedial and postmedial spots; legs dressed with white scales; abdomen with dorsal segmental black bands and lateral series of black spots..................................................................................2thronzona (Kollar)

6. Thorax and collar without fascia; tegula dressed with yellowish brown scales; forewing with antemedial, postmedial and submarginal black spots; hind wing without black patches; legs with tibia and tarsi streaked with yellow scales; valva of male genitalia having apical portion bifurcated with unequal projections, setose.................................................................leopardina (Kollar)

7. Thorax and collar with broad black fascia; tegula dressed with black scales; forewing with broad black fascia covering up to median nervure, another fascia along inner margin; hind wing with black patches; legs with tibia and tarsi streaked with yellow scales; valva of male genitalia having apical portion bifurcated with unequal projections, setose.................................................................casignata (Kollar)

8. Forewing with veins R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus without any sclerotized shield at distal end.................................................................rubilinea (Moore)

9. Forewing with R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus with a sclerotized shield at distal end .................................................................comma (Walker)

10. Forewing with veins R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus with a sclerotized shield at distal end .................................................................nicoma (Stoll)

11. Forewing with veins R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus with a sclerotized shield at distal end .................................................................obliqua (Walker)

12. Forewing with veins R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus with a sclerotized shield at distal end .................................................................multiguttata (Walker)

13. Forewing with veins R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus with a sclerotized shield at distal end .................................................................multicornutata Kaleka

14. Forewing with veins R2-R5 stalked from before upper angle of cell, without any lines or bands present; aedeagus with a sclerotized shield at distal end .................................................................himalalae Kaleka

15. Hindwing with veins Rs and M1 originating from upper angle of cell, Cu1 from lower angle of cell; male genitalia with valva having distal end bifid; vinculum with posterior expansions; aedeagus short, vesica armed with fifteen distinct spines; female genitalia with corpus bursae rather large; anterior apophyses with blunt apices, posterior apophyses with pointed tips.........................himachalis Kaleka

16. Hindwing with veins Rs and M1 stallked from upper angle of cell, Cu1 from lower angle of cell; male genitalia with valva having distal end hammer shaped; vinculum with lateral expansions; aedeagus of moderate size, curved at distal end, vesica armed with numerous spines; female genitalia with corpus bursae small; both pair of apophyses with their apices rounded.........................valvata Kaleka

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**Taxonomic studies on genus Spilarctia Butler from India**

A.P.S. Kaleka


Type locality: India.

Male genitalia: Uncus of moderate size, tip blunt, dorsally setosed, curved ventrally; large acrotergit present; fenestrae absent; tegumen inverted U-shaped, well sclerotized; vinculum slightly shorter than tegumen; saccus small. Valva simplex, sacculus slightly defined, costa ill defined; cucullus and valvula fused, tip broad and setosed; juxta saucier shaped; transtilla well developed and triangular. Aedeagus long, slightly constricted at middle; vesica furnished with four prominent and number of denticles representing comrni.

Female genitalia: Corpus bursae small, membranous, lower portion sclerotized signum absent; ductus bursae broadening towards ostium bursae well sclerotized; anterior apophyses shorter than posterior ones long, with their apices rounded; papilla analis large and triangular, fringed with macro and micro setae. (Illustrated by Kirti & Singh 1994.)

Wing expansion (half): Male: 20-22mm; Female: 21-25mm

Distribution: India: Throughout; Elsewhere: China.

References


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Required

Two field researchers for a year long study on “Seed dispersal and regeneration of hornbill dispersed tree species in the Eastern Himalayas.” This research is a continuation of an ongoing study in Pakke Tiger Reserve and adjoining Reserve Forests. The focus of the research is on the consequences of anthropogenic disturbance (primarily hunting and logging) on hornbill densities and the recruitment of their food plants and encompasses bird surveys (of hornbills and other frugivorous species), focal tree watches and vegetation assessments.

The project will be initiated in August/September 2007 (time frame negotiable) and will continue for a period of one year with the possibility of a six month extension. A monthly stipend equivalent to JRF/SRF scales of UGC as found applicable will be paid for the duration of the study. In addition, field costs will be covered.

Candidates should possess a Master’s degree in Wildlife biology/Ecology/Zoology or a related field of biology and be willing to work in extremely demanding field conditions. Prior field experience in bird identification (particularly Himalayan species) and field techniques is highly desirable.

If interested please contact

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