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## Research Article

### A new species of genus *Cyana* Walker (Lepidoptera: Arctiidae: Lithosiinae) from India

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**Abstract:** A new species, *Cyana pseudoeffracta* sp. nov. is described from Meghalaya (India). In addition to, external genitalic structures of three other species viz., *C. quadrinotata* (Walker), *C. bellissima* (Moore) and *C. harterti* (Elwes) are described. An updated checklist of Indian species of *Cyana* Walker is also given.

**Keywords:** Lepidoptera, Arctiidae, Lithosiinae, *Cyana*, new species.

## INTRODUCTION

Genus *Cyana* Walker<sup>1</sup> was established for its type species *detrita* Walker from Silhet, Bangladesh. Hampson<sup>2</sup> described as many as 22 species from British India under this genus. However, Hampson<sup>3</sup> synonymised genus *Cyana* Walker under *Chionaema* Herrich-Schäffer. Strand<sup>4</sup> followed the same nomenclature and listed a total number of 153 species under this genus. Roepke<sup>5</sup> described genus *Cyana* Walker as senior synonym and accepted its generic status with synonymization of genus *Chionaema* under it. Later on, Kishida<sup>6,7</sup> described two new subspecies i.e. *C. bellissima inouei* Kishida and *C. distinct babui* Kishida and added one new species i.e. *Cyana nigrilinea* Kishida from Nepal. Holloway<sup>8</sup> once again, accepted the priority of genus *Cyana* over *Chionaema*. However, Kaleka<sup>9</sup> considered *Cyana* Walker and *Chionaema* Herr. Sch. as distinct genera. Černý and Pinratana<sup>10</sup> again synonymised *Chionaema* Herr. Sch. under genus *Cyana* Walker and described four new species viz., *Cyana*

*inthanonica* Černý, *Cyana paeninsulana* Černý, *Cyana intercomma* Černý, *Cyana chalcidona* Černý from Thailand.

The present paper deals with the description of a new species *C. pseudoeffracta* sp. nov. along with genitalic studies of three other species i.e., *C. quadrinotata* (Walker), *C. bellissima* (Moore) and *C. harterti* (Elwes). An updated checklist of Indian species of *Cyana* Walker is also given.

## MATERIALS AND METHODS

Adult moths were collected by using vertical sheet light traps and were treated as per techniques in Lepidopterology. The detailed study of wing venation and external male genitalia of the collected material was done through slide preparations and dissections. For terminology of wing venation and external genitalia, Comstock<sup>11</sup> and Klots<sup>12</sup> have been followed. Adult moths were photographed by using digital camera. Photography of external genitalia was done with the help of an Image Processing Unit. Type of the new species has been deposited in the Department of Zoology & Environmental Sciences, Punjabi University, Patiala.

## ABBREVIATIONS

AED: Aedeagus, CO.PR: Costal process, CRN: Cornutus, CU<sub>1</sub>: First cubital vein, CU<sub>2</sub>: Second cubital vein, DU.EJ: Ductus ejaculatorius, JX: Juxta, M<sub>1</sub>: First median vein, M<sub>2</sub>: Second median vein, M<sub>3</sub>: Third median vein, R<sub>1</sub>: First radial vein, R<sub>2</sub>: Second radial vein, R<sub>3</sub>: Third radial vein, R<sub>4</sub>: Fourth radial vein, R<sub>5</sub>: Fifth radial vein, Rs: Radial Sector, Sc: Subcosta, Sc+R<sub>1</sub>: Stalk of Sc + R<sub>1</sub>, SL.PR: Saccular process, TG: Tegumen, UN: Uncus, VES: Vesica, VIN: Vinculum, 1A: First anal vein, 2A: Second anal vein.

## GENUS CYANA WALKER<sup>1</sup>

**Type species:** *Cyana detrita* Walker.

**Distribution:** India; China; Sri Lanka; Myanmar; Sumatra; Java; Borneo; Africa and Madagascar.

**Diagnosis:** Labial palpi upturned. Antennae simple in both sexes. Forewing of males with tuft of modified scales (secondary sexual features) between discal part of cell and costa. Male genitalia with uncus moderately long and broad, accus present. Valvae with costa and sacculus well differentiated, saccular process usually ending in a taper & curve to an acute apex. Aedeagus short and broad; vesica membranous with scobinated zones or clumps of spines; ductus ejaculatorius entering sub apically. Female genitalia with corpus bursae having corrugation; signum, if present, scobinate and often one or two in number.

### *Cyana pseudoeffracta* sp. nov. (Figs. 1 - 5)

**Type locality:** Jowai, Meghalaya

### Material examined:

**Holotype:** female, India: Meghalaya, Jowai, 1290 m, 08.ix.2009. Paratypes: Meghalaya, Jowai, 1290 m, 08.ix.2009, (4♀♀); Shillong, 1350 m, 07.ix.2009 (1♀) (Coll. Joshi, R) (Registration no.: PUP/RJ - 164)

**Etymology:** The name of the present species refers to its resemblance with *C. effracta* (Walker).

### Description

**Head:** Frons and vertex white. Antennae simple, yellowish-white. Labial palpi porrect, brown, covered with very few white scales. Proboscis long, coiled.

**Thorax:** Patagia and tegulae white; scarlet spots on tegulae and mesothorax. Forewing whitish with yellowish tinge at costa; a subbasal scarlet line from costa to median nervure, constricted in the middle; a scarlet spot in the middle of cell; a waved medial line, excurved in the cell and paler towards costa; two unequal spots beyond it; three large sub marginal spots, one near termen more scarlet; a yellowish band from apex to vein M<sub>3</sub>; vein Sc not anastomosing with R<sub>1</sub>; R<sub>2</sub> from upper angle; R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> stalked; M<sub>1</sub> absent; M<sub>2</sub>, M<sub>3</sub> stalked; Cu<sub>1</sub> from before lower angle; Cu<sub>2</sub> beyond middle. Hindwing whitish; vein Sc+R<sub>1</sub> from middle of cell; Rs, M<sub>1</sub> stalked; M<sub>2</sub> from below middle of cell; M<sub>3</sub> and Cu<sub>1</sub> shortly stalked; Cu<sub>2</sub> from near middle of cell; underside with a black discoidal lunule. Fore and mid legs banded with black; hind leg white with median tibial spurs short, terminal spurs long.

**Abdomen:** Fuscous covered with white hairs; anal tuft yellow.

**Female genitalia:** Corpus bursae irregularly shaped; posteriorly constructed and sclerotized; prominent signum present; cervix bursae sclerotized; ductus seminalis entering cervix bursae; ductus bursae short, sclerotized; anterior apophyses very small than posterior papilla analis beset with long setae.

**Wing span:** Female 30 mm.

**Remarks :** Morphologically, the new species resembles *C. effracta* (Walker) but differs in having whitish ground colour of wings, presence of single transverse bands on forewing and presence of lunule in hind wing whereas, in *C. effracta* (Walker) wings are yellowish-white, fore wings with multiple transverse bands and hind wings without any lunule.

*Cyana harterti* (Elwes)<sup>2, 3, 13, 14</sup> (Figs. 6 - 12)

**Material examined:**

India, Assam: Jatinga, 650 m, 10.ix.2009, (2♂); Mizoram: Serchip, 890 m, 24.ix.2009, (1♂) (Coll. Joshi, R.) (Registration no.: PUP/RJ – 160)

**Description**

**Male genitalia:** Uncus blunt; tegumen longer than uncus, broader, inverted U-shaped; vinculum broad, U-shaped, as long as tegumen; saccus short. Valvae with costal margin wavy, obtuse near middle, differentiated into valvula and cucullus, apically rounded; harpe membranous; saccular process sclerotized, tip pointed. Juxta elevated, weakly sclerotized; transtilla membranous. Aedeagus moderately long, broader at base; vesica short, membranous; two patches of long cornuti present; ductus ejaculatorius entering subapically.

**Wing span:** Male 20 mm.

**Distribution:** India (Upper Assam, Mizoram); Hongkong; Singapore.

**Remarks:** Male genitalia of the species under reference has been photographed and described in detail for the first time to update the diagnosis of this species.

*Cyana quadrinotata* (Walker)<sup>10,15,16</sup> (Figs. 13 - 18)

**Material examined:**

India, Assam : Jatinga, 650 m, 09.ix.2009, (6♂) (Coll. Joshi, R.); Mizoram: Aizwal, 1130 m, 15.ix.2008, (1♂) (Coll. Joshi, R. & Singh, N.); Thingsul, 850 m, 13.ix.2008, (5♂♂) (Coll. Joshi, R. & Singh, N.)(Registration no.: PUP/RJ - 161)

**Description**

**Male genitalia:** Uncus moderately long, slender, tip pointed, sparsely setosed; tuba analis membranous; tegumen longer than uncus, inverted V-shaped, basally setosed with long hairs; vinculum shorter than tegumen, V-shaped; saccus long and narrow. Valvae with costa wavy; cucullus long, weakly sclerotized, densely setosed with setae, a spine in middle and another at apex; valvula membranous, flap-like; harpe as oblique ridge; sacculus short linear, reaching upto harpe. Juxta squarish, sclerotized; transtilla membranous. Aedeagus long, base narrow; vesica short, membranous; pair of hook-like cornuti, unequal in length; ductus ejaculatorius entering laterally.

**Wing span:** Male 20 mm.

**Distribution:** India (Sikkim, Assam, Mizoram); Vietnam; Thailand.

**Remarks:** The species under reference was synonymised under *C. alborosea* (Walker) by Hampson<sup>3</sup> and Fang<sup>14</sup>. However, Černý and Pinratana<sup>10</sup> revived its specific status and the same has been reconfirmed in the present studies.

*Cyana bellissima* (Moore)<sup>2,3,6,14,17,18,19</sup> (Figs. 19 - 23)

**Material examined:**

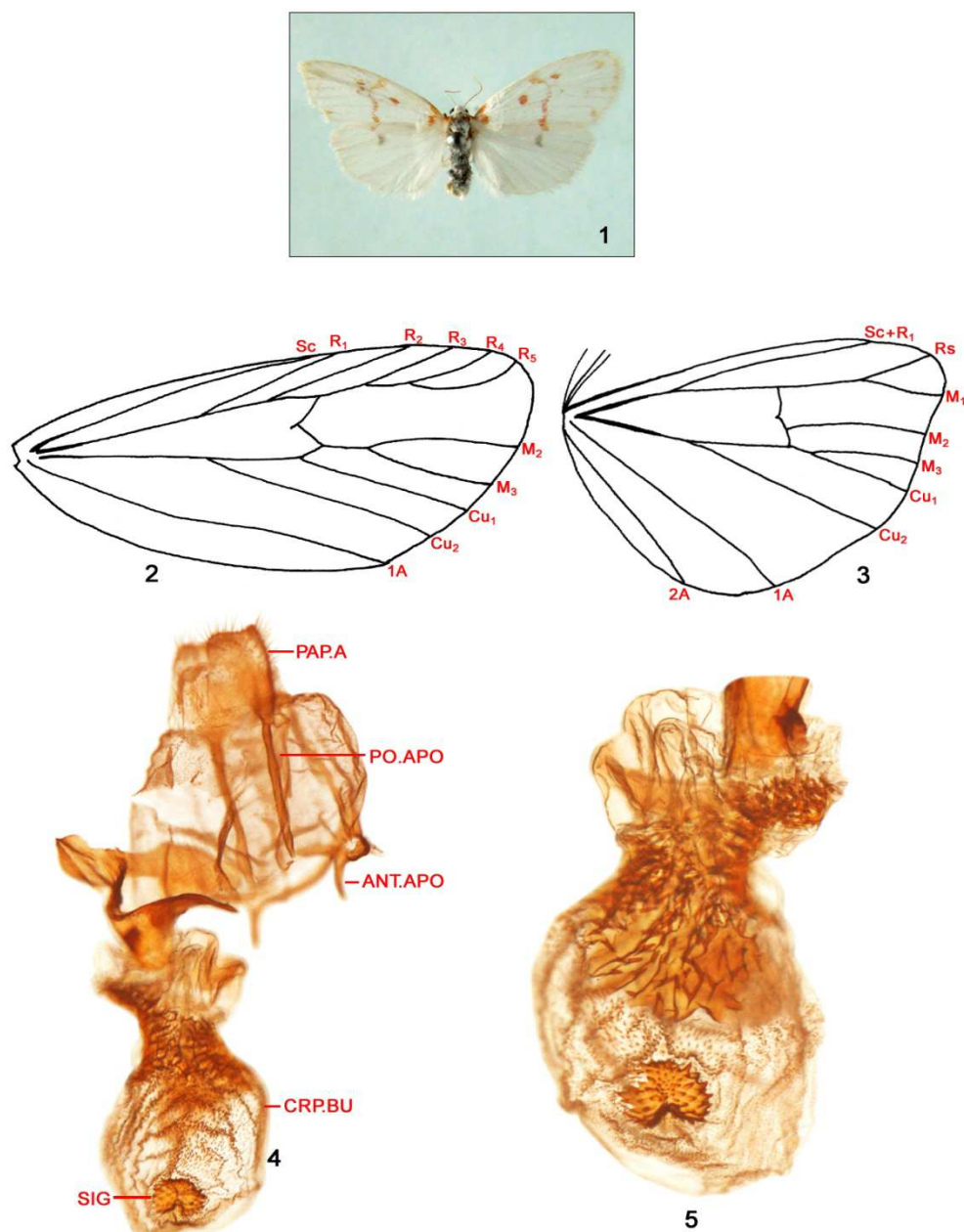
India, Sikkim : Golitar, 1500 m, 26.iv.2009, (8♀); Ravangla, 2100 m, 23.iv.2010, (13♀); Aritar, 1700 m, 30.iv.2009, (11♀) (Coll. Joshi, R.) (Registration No.: - PUP/RJ - 162).

**Female genitalia:** Corpus bursae almost globular, membranous with some sclerotization; signum present; cervix bursae sclerotized; ductus seminalis entering cervix bursae; ductus bursae short, tubular, sclerotized; anterior apophyses shorter than posterior apophyses; papilla analis beset with short and long setae.

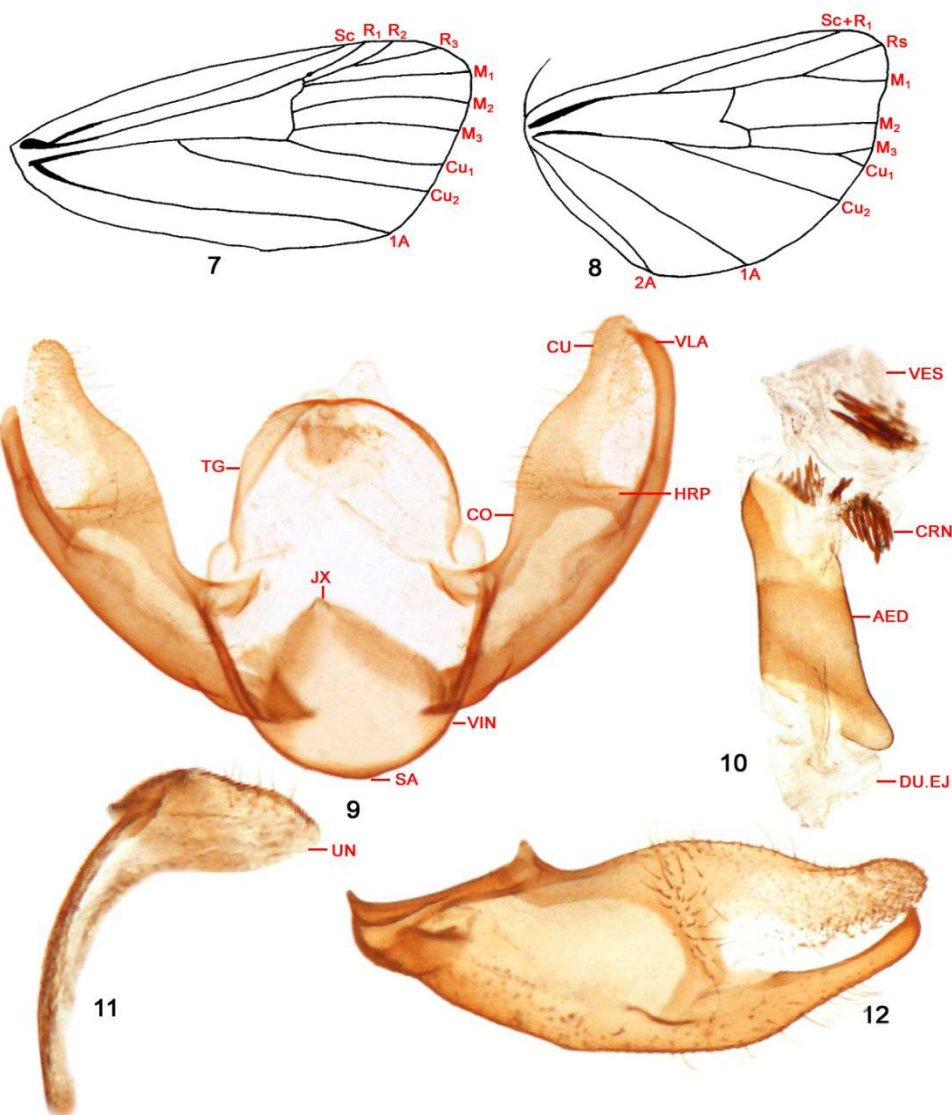
**Wing span:** Female 40 mm.

**Distribution:** India (N.W. Himalayas, Sikkim); Nepal; China; Vietnam; Thailand; Malaysia.

**Remarks:** The external male genitalia of this species was studied by Kishida<sup>6</sup> and the female genitalia is described here for the first time.

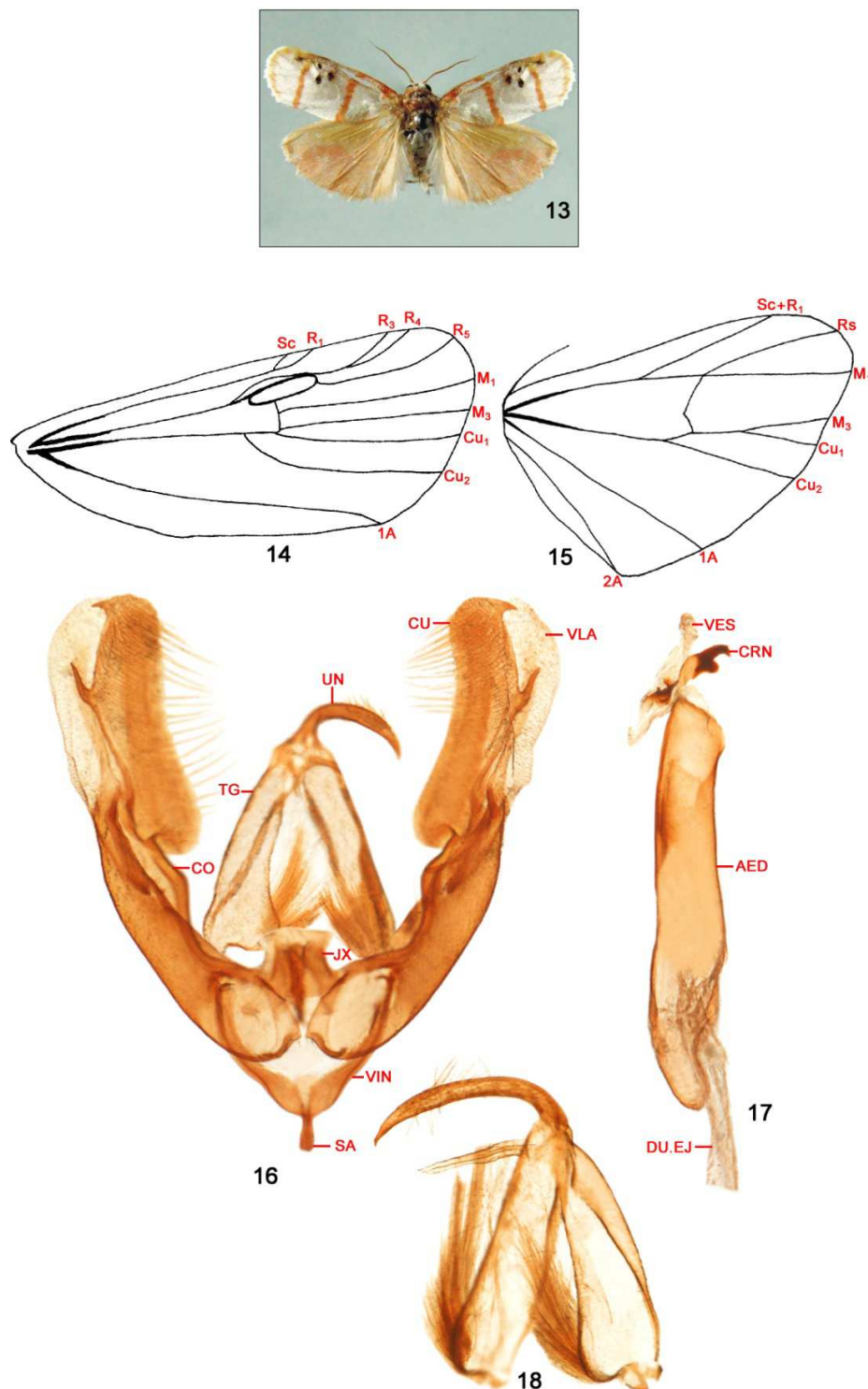


Figs. 1 - 5. *Cyana pseudoeffracta* sp. nov. : 1 Adult Female, 2. Forewing, 3. Hindwing, 4. Female genitalia, 5. Corpus Bursae (Enlarged)

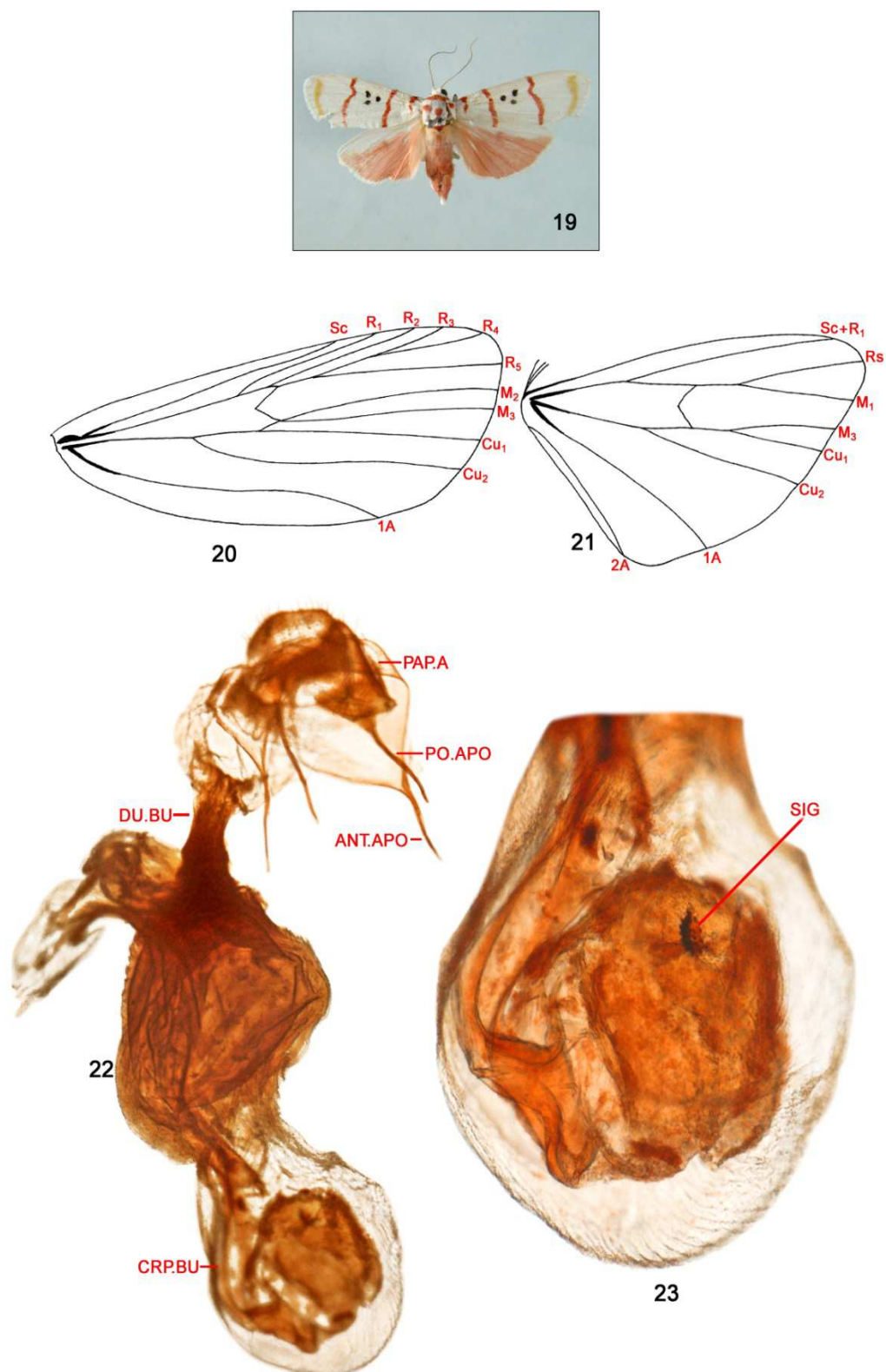


Figs 6 – 12: *Cyana harterti* (Elwes): 6. Adult male, 7. Forewing, 8. Hindwing, 9. Male genitalia, 10. Aedeagus, 11. Uncus with Tegumen (Lateral view), 12. Valva





Figs. 13 – 18: *Cyana quadrinotata* (Walker): 13. Adult male, 14. Forewing, 15. Hindwing, 16. Male genitalia, 17. Aedeagus, 18. Uncus with Tegumen (Lateral view)



Figs. 19 – 23: *Cyana bellissima* (Moore): 19. Adult male, 20. Forewing, 21. Hindwing, 22. Female genitalia, 23. Corpus Bursae (Enlarged)



**Table-1: An updated checklist of species under genus *Cyana* Walker from India.**

<i>Cyana adita</i> (Moore)	Sikkim, North West Himalayas (Kangra, Dalhousie, Shimla), West Bengal (Darjeeling)
<i>Cyana alborosea</i> (Walker)	Sikkim, Assam, West Bengal (Darjeeling)
<i>Cyana amabilis</i> (Moore)	Andaman & Nicobar Islands
<i>Cyana arama</i> (Moore)	North East Himalayas
<i>Cyana bellissima</i> (Moore)	North West Himalayas, Assam, Sikkim, Meghalaya, West Bengal
<i>Cyana bianca</i> (Walker, 1856)	Sikkim, Assam, Arunachal Pradesh, Himachal Pradesh
<i>Cyana candida</i> Felder & Rogenhofer	North West Himalayas, Sikkim, West Bengal, Meghalaya
<i>Cyana catorhoda</i> Hampson	Meghalaya (Khasis)
<i>Cyana coccinea</i> (Moore)	Sikkim, Andaman
<i>Cyana detrita</i> Walker	North West Himalayas (Himachal Pradesh, Uttarakhand) Sikkim, Meghalaya (Khasis), Nagaland (Nagas), West Bengal (Darjeeling)
<i>Cyana divakara</i> (Moore)	Sikkim, Assam
<i>Cyana dohertyi</i> (Elwes)	North West Himalayas, Sikkim, Meghalaya (Khasis)
<i>Cyana dudgeoni</i> Hampson	Sikkim, Assam, Arunachal Pradesh
<i>Cyana effracta</i> (Walker)	North East Himalayas
<i>Cyana flavicincta</i> (Hampson)	Assam
<i>Cyana gazella</i> (Moore)	North West Himalayas (Kangra), Sikkim, West Bengal (Darjeeling)
<i>Cyana gelida</i> (Walker)	North West Himalayas (Kangra), Sikkim, Assam
<i>Cyana guttifera</i> (Walker)	North West Himalayas, (Landoor, Kangra), Sikkim, Assam, Maharashtra (Mumbai), Kerala (Travancore), Andaman, West Bengal (Darjeeling)
<i>Cyana hampsoni</i> (Kaleka)	Arunachal Pradesh
<i>Cyana harterti</i> (Elwes)	Assam, Mizoram
<i>Cyana javanica</i> (Butler)	Nicobar Islands
<i>Cyana khasiana</i> Hampson	Meghalaya (Khasis)
<i>Cyana moelleri</i> (Elwes)	Sikkim, Meghalaya (Khasis)
<i>Cyana obliquilineata</i> (Hampson)	Sikkim, Assam
<i>Cyana peregrina</i> (Walker)	Tamil Nadu ( Nilgiris, Coimbatore) Orissa (Cuttack), Kerala (Travancore)
<i>Cyana perornata</i> (Walker)	North East Himalayas
<i>Cyana pseudoeffracta</i> <b>sp. nov.</b>	Meghalaya (Jowai)
<i>Cyana puella</i> (Drury)	North West Himalayas, Maharashtra (Mumbai), Tamil Nadu (Nilgiris), Sikkim
<i>Cyana puer</i> (Elwes)	Sikkim, Meghalaya (Khasis), Nagaland (Nagas), Manipur, West Bengal (Darjeeling)
<i>Cyana quadrinotata</i> (Walker)	Assam, Mizoram, Sikkim
<i>Cyana selangorica</i> (Hampson)	Nicobar Islands
<i>Cyana signa</i> (Walker)	Assam
<i>Cyana sikkimensis</i> (Elwes)	Sikkim
<i>Cyana subornata</i> (Walker)	Maharashtra, Karnataka, Andaman
<i>Cyana tripunctata</i> ( Rothschild)	South Andaman

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