

**REVALIDATION OF GENUS *CHIONAEMA* HERRICH SCHÄFFER  
(LITHOSIINAE: ARCTIIDAE: LEPIDOPTERA)  
ALONG WITH GENETALIC STUDIES ON SIX SPECIES  
FROM NORTHERN AND NORTHEASTERN INDIA**

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**Abstract**

Detailed morphological studies, including the male and female genitalic structures revealed that the type species i.e. *puella* Drury of the genus *Chionaema* Herrich Schäffer is altogether different from *detrita* Walker, the type species of genus *Cyana* Walker. Accordingly, the genus *Chionaema* with the type species *puella* Drury is being revived. The genitalic features of five other species i.e. *bellissima* (Moore), *catorhoda* Hampson, *obliquilineata* Hampson, *dudgeoni* Hampson and *alborosea* (Walker) of genus *Chionaema* have also been critically examined. These species completely conform to the characterization of type species of genus *Chionaema*.

**Keywords**

*Chionaema, Cyana, type species, genitalia*

**Abbreviations**

ACC. SC - Accessory Sac  
AM - Ampulla  
CO - Costa  
CRP.BU - Corpus bursae  
DU.BU - Ductus bursae  
GP - Genital plate  
M - Medial vein  
PO.APO - Posterior apophyses  
SA - Saccus  
SIG - Signum  
TG - Tegumen  
UN - Uncus  
VLA - Valvula

AED - Aedeagus  
ANT.APO - Anterior apophyses  
CRN - Cornuti  
Cu - Cucullus  
DU.EJ. - Ductus ejaculatoris  
JX - Juxta  
PAP.A - Papilla analis  
R - Radial vein  
Sc+R - Subcosta and radial vein  
SL - Sacculus  
TRA - Transtilla  
VIN - Vinculum

**Introduction**

While conducting surveys in northern and northeastern India, as many as forty four specimens of six species were collected and identified as *puella* Drury, *bellissima* Moore, *catorhoda* Hampson, *obliquilineata* Hampson, *dudgeoni* Hampson and *alborosea* Walker under genus *Cyana* with the help of relevant literature (Hampson, 1894, 1900; Arora & Chadhury, 1982; Kishida, 1991). While dealing with genus *Chionaema*, Hampson

(1900, 1914) listed *Cyana* as one of its synonyms. Roepke (1944) reversed this taxonomic arrangement with a hint that the type species of genus *Cyana* i.e. *detrita* Walker may become separated generically from those species characterized by their white ground colour with red cross lines or bands on forewing. The studies of different morphological structures including genitalia indicates that the type species of *Chionaema* i.e. *puella* Drury is altogether different from type species of genus *Cyana* with

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respect to uncus, valvula and cucullus of male genitalia and ductus bursae of female genitalia, Watson *et al.* (1980) have listed both the genera with their type species in their volume, Thus both these genera are distinct. Accordingly other five species conform to the characterization of type species of *Chionaema* and form a natural group. A key to differentiate both the genera has been formulated and key to the species of genus *Chionaema*, studied during present investigations is also given.

## Observations

### Genus *Chionaema* Herrich Schäffer

Herr. Schäffer, 1855, Syst. Bearbeitung Schmett. Eur. 6: 100-101

Type species: *Chionaema puella* Drury

### Distribution

Throughout India; Africa; China; Indonesia; Myanmar; Sri Lanka

### Diagnostic features

Labial palpus slender and upturned, not reaching lower level of frons. Antenna simple, ciliated. Hind tibia with two pair of spurs. Forewing narrow; male with a more or less strongly developed fringe of hair from middle of costa on upper side and lobe on underside which may be uni-lobate, bi or trilobate; veins  $R_3$ - $R_5$  stalked; vein  $M_1$  originating from upper angle, absent in female;  $M_2$  usually above lower angle, absent in male;  $M_3$  from lower angle of cell;  $Cu_1$  arising from before or from lower angle of cell;  $Cu_2$  from near middle of cell. Hindwing with vein  $Sc+R_1$  from or beyond middle of cell;  $M_1$  and  $Rs$  usually stalked from upper angle;  $M_2$  arising from above lower angle of cell;  $M_3$  and  $Cu_1$  usually stalked from lower angle of cell;  $Cu_2$  from beyond middle of cell. Male genitalia with uncus simple, narrow, curving ventrally; tegumen well developed; vinculum broad ending into U or V-shaped saccus, inner wall of saccus may be produced to form hump. Valva elongate; sacculus and costa well differentiated; valvula usually shorter than cucullus with a beaked or pointed tip; cucullus semi-sclerotized with rounded tip; juxta well developed; transtilla prominent; aedeagus of moderate size, vesica armed with well defined cornuti. Female genitalia with corpus bursae of variable size, usually membranous; signum may be present or absent; ductus bursae quite long, anterior half slightly or well sclerotized, posterior half membranous; anterior apophyses smaller than posterior ones; papilla analis of moderate size, semi-sclerotized.

### *Chionaema bellissima* (Moore)

(Figs. 1-4)

*Bizone bellissima* Moore, 1878, Proc. Zool. Soc. 1878: 27; Kirby, 1892, Cat. Het., 1: 301; Hampson, 1894, Moths Ind. 2: 61; id., 1900, Cat. Lep. Phal., 2: 319.

### Material examined

One male, 29.ix.1994, Jowaii, Jaintia Hills, Meghalaya; one male, 2.x.1994, Cherapunjee, Meghalaya; one male, 08.vi.1995, Choukori, Uttaranchal; one male, 29.iv.1995, Kurseong, West Bengal.

### Wing expanse (half)

Male: 19-23mm.

### Distribution

Meghalaya: Jowaii, Jaintia Hills, Cherapunjee; Sikkim; Uttaranchal: Mussorrie Town, Choukuri; West Bengal: Kurseong.

### Diagnostic features

Male genitalia: Uncus short and narrow, tapering towards tip; tegumen broad at base of uncus; vinculum well developed, U-shaped, broad at base, narrow towards tegumen; saccus with its outer wall straight and inner produced out-wardly. Valva broad, sacculus and costa defined; cucullus of equal width, a sclerotized patch at its base present; valvula highly sclerotized near tip, ending into a prominent spine; juxta flask-shaped, theca crested; transtilla defined. Aedeagus with both of its walls well sclerotized, narrow anteriorly, broad and rounded posteriorly; vesica armed with a scobinate patch in middle, spine-like cornuti and densely packed spines at the distal end.

Female genitalia: Not examined.

### Remarks

Reporting of this species from above mentioned localities of Meghalaya and West Bengal are its additional distributional areas in northeastern India.

### *Chionaema catorhoda* Hampson

(Figs. 5-8)

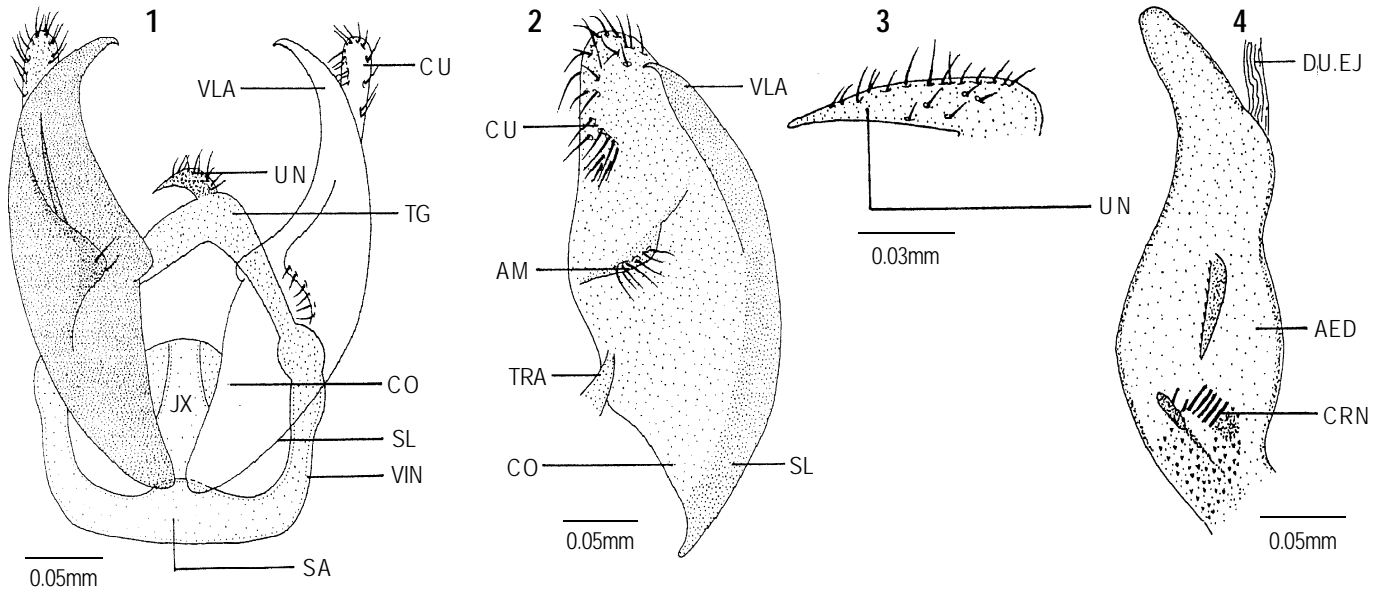
Hampson, 1897, Journ. Bomb. Nat. Hist. Soc. 11: 296; id. 1900, Cat. Lep. Phal 2: 297.

### Material examined

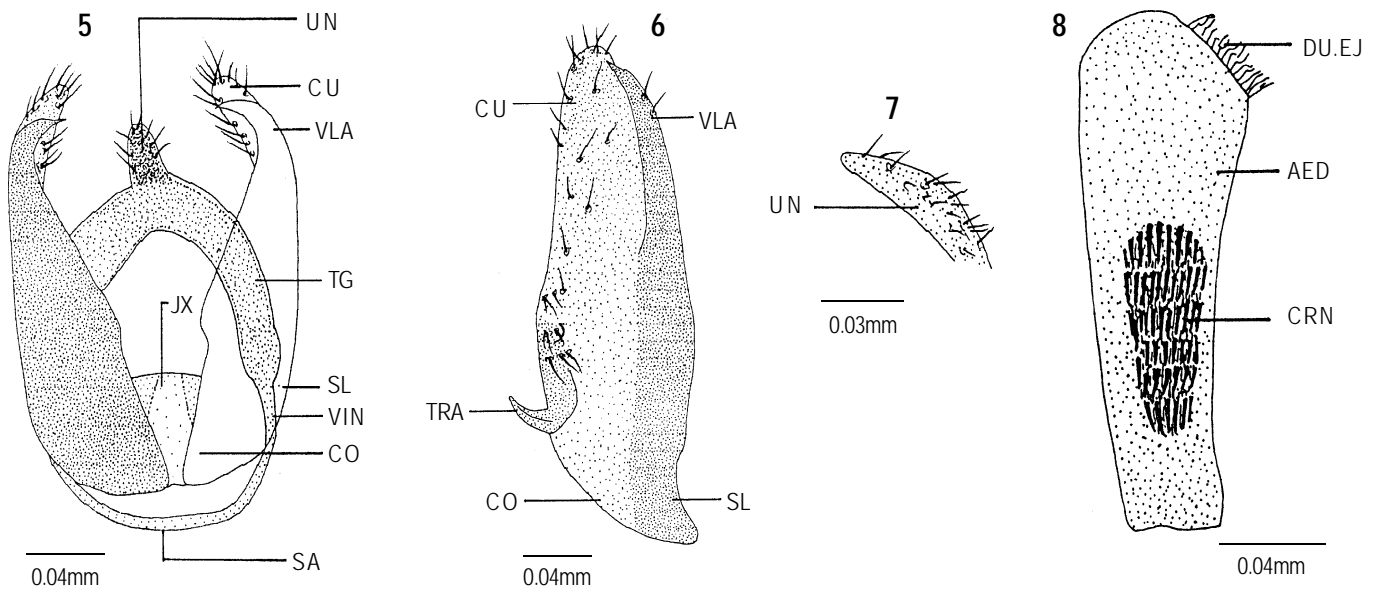
One male, 30.ix.1995, Jatinga, North Cachar Hills, Assam

### Wing expanse (half)

Male: 13mm



**Figures 1-4. *Chionaema bellissima* Moore**  
 1. Male genitalia; 2. Valva - left inner view; 3. Uncus - enlarged; 4. Aedeagus



**Figures 5-8. *Chionaema catorhoda* Hampson**  
 5. Male genitalia; 6. Valva - left inner view; 7. Uncus - enlarged; 8. Aedeagus

**Distribution**

India: Assam: Jatinga, North Cachar Hills; Meghalaya: Khasi Hills.

Elsewhere: Myanmar.

**Diagnostic features**

Male genitalia: Uncus narrow, reduced, with rounded tip, semi-sclerotized, dorsally setosed; tegumen broad, semi-sclerotized, vinculum shorter than tegumen, ending into U-shaped narrow walled saccus; saccus well sclerotized. Valva long and narrow, with sacculus and costa defined; cucullus extending slightly beyond valvula, with a setosed rounded tip; valvula with sharply pointed tip; juxta flask-shaped, theca slightly crested; transtilla bar-like. Aedeagus short, with broad, rounded anterior end, narrowing towards distal end; vesica armed with a long patch of densely packed spines from middle and beyond this patch with small denticles.

Female genitalia: Not examined

**Remarks**

This species is newly recorded from Jatinga (Assam).

***Chionaema obliquilineata* Hampson**

(Figs. 9-13)

Hampson., 1900, Cat. Lep. Phal., 2: 299.

**Material examined**

One male, 12.ix.1991, one female 14.ix.1991, one female; 23.ix.1993, Jatinga, North Cachar Hills, Assam.

**Wing expanse (half)**

Male: 11mm

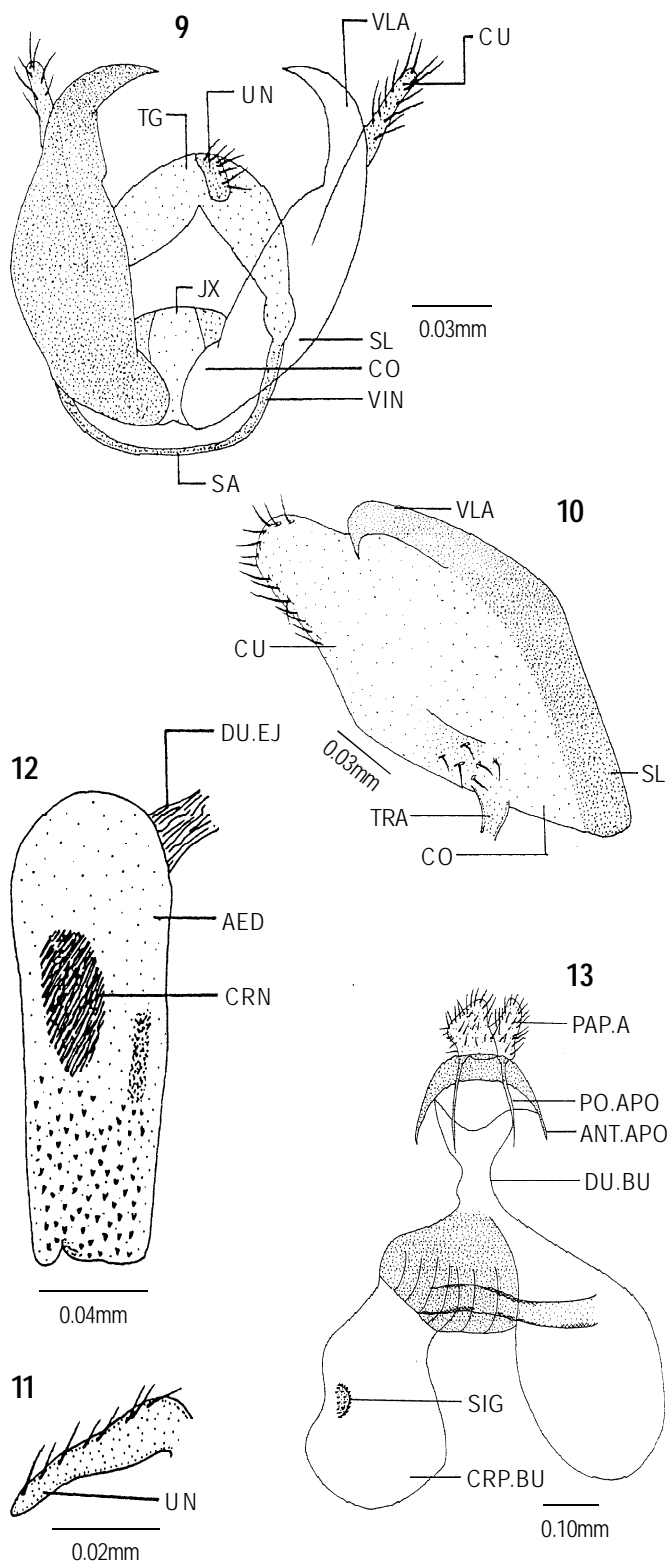
Female: 14mm

**Distribution**

Assam: Jatinga, North Cachar Hills; Sikkim

**Diagnostic features**

Male genitalia: Uncus small, highly curved, broad at base, narrowing towards middle and tapering at distal end; tegumen long, narrowing towards vinculum, broad near base of uncus; vinculum half the size of tegumen, with lateral sides slightly produced; saccus reduced and U-shaped. Valva simple, with costa and sacculus slightly defined; valvula ending into a spine-like structure distally; cucullus extending slightly beyond valvula; juxta broad, flask-shaped, theca crested; transtilla bar-like. Aedeagus rounded and broad anteriorly, with both of its wall equally sclerotized; vesica with a patch of densely packed spines in middle, with a large number of denticles around the patch and in posterior half.



**Figures 9-13. *Chionaema obliquilineata* Hampson**  
 9. Male genitalia; 10. Valva - left inner view; 11. Uncus - enlarged; 12. Aedeagus; 13. Female genitalia

**Female genitalia:** Corpus bursae oblong, rounded anteriorly, constricted in middle, membranous; a single clad-like signum present; ductus bursae small, broad anteriorly, slightly sclerotized, narrowing posteriorly and membranous; anterior apophyses half length of posterior ones, both pairs narrow with their apices pointed; papilla analis triangular setosed with micro and macrosetae.

**Remarks**

Collection of this species from Jatinga is its first record from Assam.

***Chionaema dudgeoni* Hampson**  
(Figs. 14-18)

Hampson, 1894, Moths Ind., 2: 492; id., 1895, Trans. Ent. Soc., 1895: 293; id. 1896, Journ. Bomb. Nat. Hist. Soc., 11: 296; id. 1900, Cat. Lep. Phal., 2: 321.

**Material examined**

One male, 26.ix.1995, one female, 27.ix.1995, one female, one male, 30.ix.1995, Jatinga, North Cachar Hills, Assam.

**Wing Expanse (half)**

Male: 13 mm

Female: 17 mm

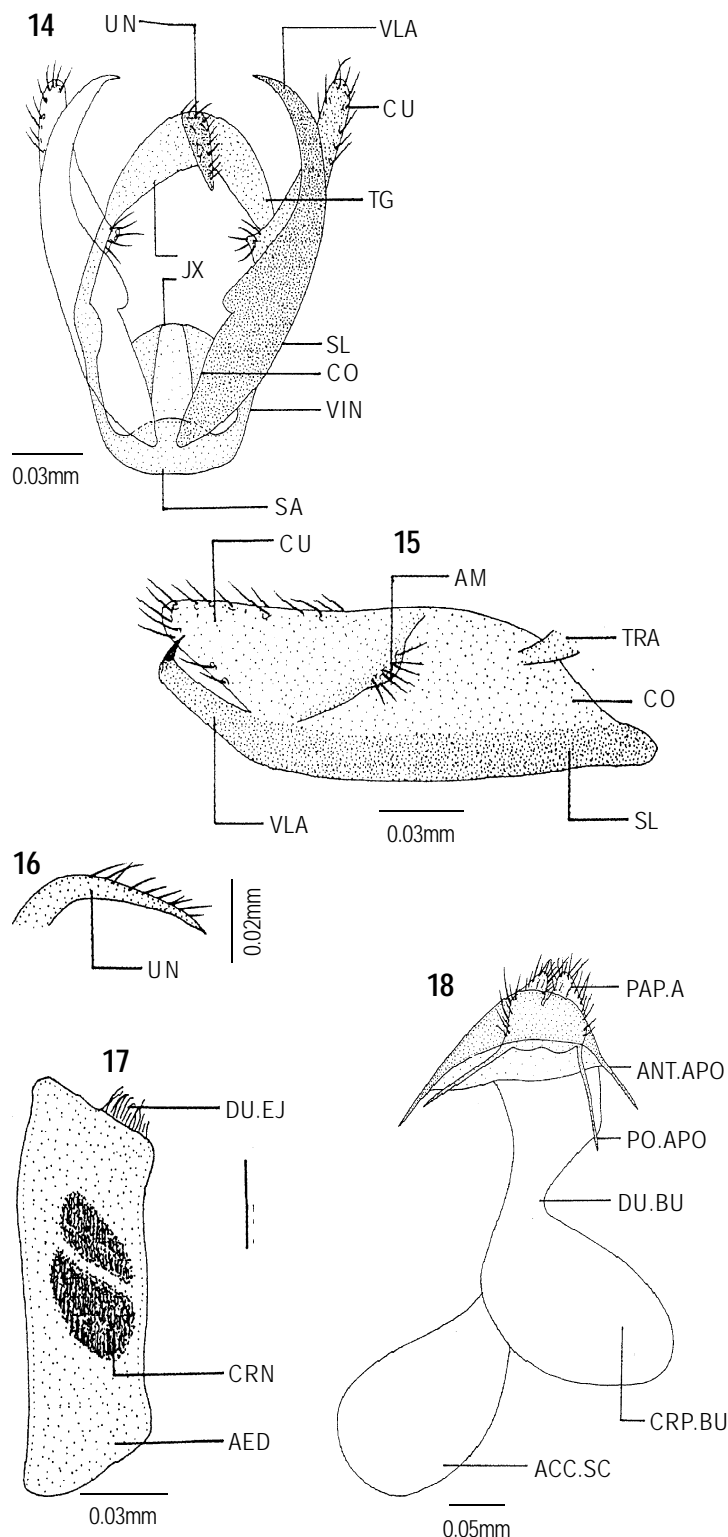
**Distribution**

India: Assam: Jatinga, North Cachar Hills; Meghalaya: Khasi Hills; Sikkim.

**Diagnostic features**

**Male genitalia:** Uncus of moderate size, curved, tip beak-like; tegumen with both of its arms broad at base of uncus, narrow towards vinculum; vinculum shorter than tegumen, well sclerotized; saccus small, U-shaped. Valva simple with sacculus and costa marked; cucullus with a median sclerotized projection, produced into a rounded setosed patch; juxta long, gradually tapering towards distal end; transtilla defined. Aedeagus with its tip slightly produced and rounded, both of its walls well sclerotized; vesica armed with two patches bearing number of densely packed cornuti.

**Female genitalia:** Corpus bursae oval, membranous; signum absent; ductus bursae membranous; accessory sac present; both pair of apophyses with their apices pointed, anterior apophyses shorter than posterior apophyses; papilla analis triangular and broad, fringed with short and long setae.



**Figures 14-18. *Chionaema dudgeoni* Hampson**  
14. Male genitalia; 15. Valva - right inner view; 16. Uncus - enlarged; 17. Aedeagus; 18. Female genitalia

***Chionaema puella* Drury**  
(Figs. 19-23)

Drury, 1773, III. Ex. Ent., 2: 403; Kirby, 1892, Cat. Het. 1: 302; Hampson., 1894, Moths Ind., 2: 57; id. 1900, Cat. Lep. Phal., 2: 298.

**Material examined**

Three females, 07.vii.1991, one female, 08.vii.1991, two females, four males, 31.vii.1994, one male 15.vii.1991, one female, 28.ix.1991, Solan, Himachal Pradesh; one female, 1.viii.1994, Nauni, Himachal Pradesh; one female, 9.ix.1995, Macleodganj, Himachal Pradesh; one femlae, 11.vi.1994, two females, two males, 12.vi.1994, Mussorie, Uttaranchal; one female, two males, 13.vi.1994, Kempty Falls, Uttaranchal; one female, 14.vi.1994, Chakrata, Uttaranchal; three females, 28.vii.1994, Kud, Jammu and Kashmir; one male, 30.viii.1994, Ramanagar, Jammu and Kashmir; one female, 28.viii.1994, Patnitop, Jammu and Kashmir.

**Wing expanse (half)**

Male: 14mm

Female: 17mm

**Distribution**

Himachal Pradesh: Macleodganj, Nauni, Solan, Shimla, Dalhousie;

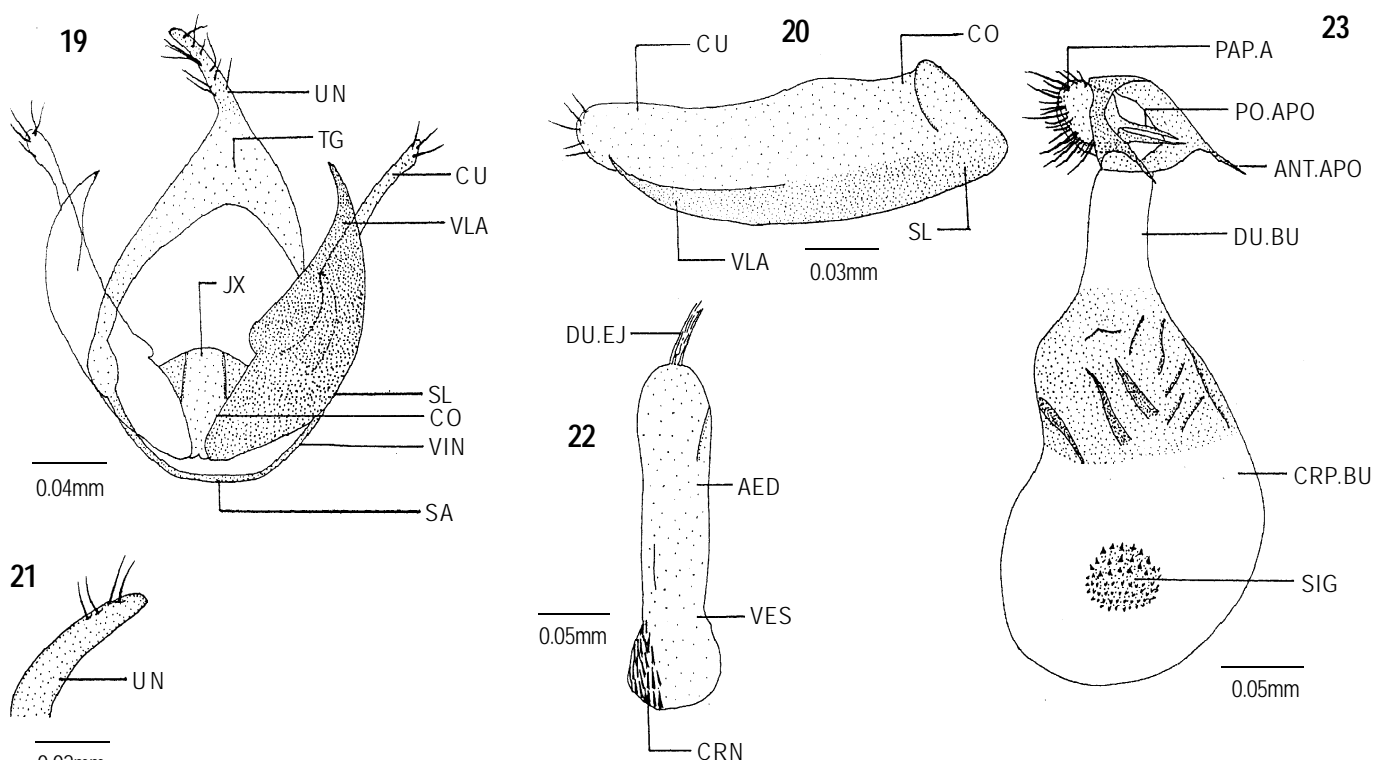
Jammu and Kashmir: Kud, Ramanagar, Patnitop; Maharashtra: Kangra, Ambala, Mumbai; Tamil Nadu: Nilgiri Hills; Uttaranchal: Kempty Falls, Mussourie, Chakrata

**Male genitalia:** Uncus short, obliquely curved at base, with setosed tip; tegumen long and narrow; vinculum shorter than tegumen; saccus broad, with both walls narrow and cup-shaped. Valva simple; costa and sacculus ill defined; valvula moderately sclerotized, with its distal end sharply pointed; cucullus large, with its tip rounded. Aedeagus small and broad, with both of its walls slightly but equally sclerotized; vesica without any cornutus.

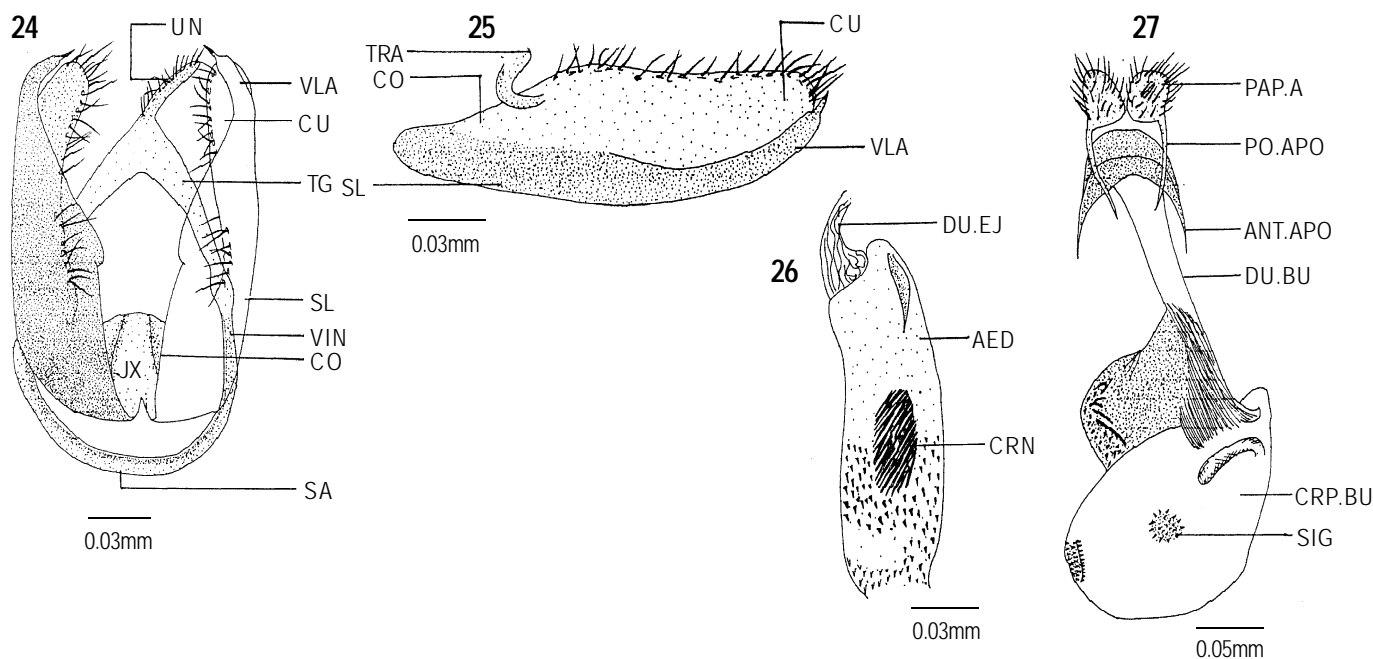
**Female genitalia:** Corpus bursae large, globular, membranous proximally, with distal part heavily sclerotized; a pair of crescentiform signa; ductus bursae small and membranous; apophyses narrow with their apices pointed; anterior apophyses less than half length of posterior ones; papilla analis broad, setosed with a fine fringe of large number of micro and few macro setae.

**Remarks**

Collection of the present species from above mentioned localities are its additional distributional areas.



**Figures 19-23. *Chionaema puella* Drury**  
19. Male genitalia; 20. Valva - right inner view; 21. Uncus - enlarged; 22. Aedeagus; 23. Female genitalia



Figures 24-27. *Chionaema alborosea* Walker  
24. Male genitalia; 25. Valva - left inner view; 26. Aedeagus; 27. Female genitalia

### *Chionaema alborosea* (Walker)

(Figs. 24-27)

*Lithosia alborosea* Walker., 1864, Cat. Lep. Het., 31: 230; Kirby, 1892, Cat. Het., 1: 302; Hampson., 1894, moths Ind., 2: 56 & 4: 492; id, 1900, Cat. Lep. Phal. 2: 298-299.

#### Material examined

Two males, 29.ix.1994, one female, 30.ix.1994; one female, 02.x.1994, Jatinga, North Cachar Hills, Assam; Cherapunjee, Meghalaya.

#### Wing expanse (half)

Male: 13mm

Female: 15mm

#### Distribution

India: Assam: Jatinga, North Cachar Hills; Meghalaya: Cherapunjee; Sikkim

Elsewhere: Myanmar.

Male genitalia: Uncus short, curved, tip rounded, semi-sclerotized, dorsally setosed; tegumen slightly sclerotized, longer than vinculum; vinculum U-shaped; saccus reduced. Valva small, sacculus and costa defined; valvula well developed with a sharply pointed small spine-like distal end; cucullus ending at the same level of valvula; juxta broad, well developed; transtilla bar-like. Aedeagus small, with rounded anterior end; vesica armed with a

patch of densely packed cornuti in middle.

Female genitalia: Corpus bursae oval, membranous; a pair of signa present; ductus bursae broad anteriorly, narrow posteriorly, anterior half with sclerotized lining; anterior apophyses small, sharply produced into narrow apices; posterior apophyses much longer than anterior apophyses and with pointed ends; papilla analis broad, setosed with fine setae.

#### Acknowledgements

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**Key to differentiate *Cyana* Walker and *Chionaema* Herrich Schäffer**

1. Forewing with white ground colour having red or orange bands; male genitalia with valvula ending well below cucullus, saccus narrow, aedeagus with well packed patch of prominent spines and denticles; female genitalia with ductus bursae having anterior half sclerotized and posterior half membranous...  
..... *Chionaema* Herrich Schäffer
- 1A. Forewing with aberrant colour pattern; male genitalia with cucullus ending well below valvula, saccus broad, aedeagus with a circular shield with denticle like cornuti; female genitalia with ductus bursae short and well sclerotized ..... *Cyana* Walker

**Key to the species of genus *Chionaema* Herrich Schäffer**

1. Forewing with terminal yellow band; hindwing with ground colour crimson; abdomen brick red; male genitalia with uncus pointed at tip ..... *bellissima* (Moore)
- 1A. Forewing without terminal band; hindwing with ground colour white, suffused with crimson; abdomen not brick red; male genitalia with uncus not pointed at tip ..... 2
2. Hindwing with veins  $M_2$  and  $M_3$  highly stalked from lower angle,  $Cu_1$  before lower angle of cell; male genitalia with aedeagus having anterior tip broad, narrowing gradually towards distal ..... *catorhoda* Hampson
- 2A. Hindwing with vein  $M_2$  arising from above lower angle, veins  $M_3$  and  $Cu_1$  stalked from lower angle of cell; male genitalia with aedeagus almost of equal width ..... 3
3. Collar and tegula edged with crimson scales; forewing with three black spots in both sexes; crimson bands on forewing; female genitalia with corpus bursae globular, signum missing or single signum present .....4
- 3A. Collar and tegula edged with scarlet scales; forewing of male possess three black spots and that of female with one spot; scarlet bands on forewing; female genitalia with corpus bursae oblong, bulb-shaped, a pair of signa present ..... 5
4. Forewing with a yellow streak just below costa interrupting post-medial band; tarsi banded with white and orange scales; male genitalia with uncus having rounded tip; saccus thick-walled; female genitalia with corpus bursae having a clad-like signum, ductus bursae with anterior half sclerotized and posterior half membranous ..... *obliquilineata* Hampson
- 4A. Forewing with a black streak beyond postmedial band; tarsi banded with white and fuscous scales; male genitalia with uncus having beak-like-tip; saccus thin walled; female genitalia with corpus bursae without signum; ductus bursae membranous ..... *dudgeoni* Hampson
5. Labial palpus decorated with crimson scales; forewing with orange streak below costa beyond post-medial band; male genitalia with cucullus extending beyond valvula; saccus thin walled; aedeagus having vesica without denticles; female genitalia with anterior apophyses slightly shorter than posterior ones ..... *puella* Drury
- 5A. Labial palpus with first segment decorated with white scales, but second and third having black; forewing with a brownish mark beyond postmedial band; male genitalia with cucullus and valvula reaching same level; saccus thick walled; aedeagus with vesica armed with numerous denticles; female genitalia with anterior apophyses, less than half the length of posterior ones ..... *alborosea* (Walker)