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Journal of  
Threatened  
Taxa

Open Access

10.11609/jott.2022.14.11.22039-22206

[www.threatenedtaxa.org](http://www.threatenedtaxa.org)

26 November 2022 (Online & Print)

14 (11): 22039-22206

ISSN 0974-7907 (Online)

ISSN 0974-7893 (Print)



ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

Publisher  
**Wildlife Information Liaison Development Society**  
www.wild.zooreach.org

Host  
**Zoo Outreach Organization**  
www.zooreach.org

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continued on the back inside cover

Cover: Muggar Crocodile basking on the banks of Savitri River at Mahad in Maharashtra, India. © Utkarsha M. Chavan.



## A new species of genus *Neocerura* Matsumura, 1929 (Notodontidae: Lepidoptera) from India

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**Abstract:** A new species *Neocerura convergata* under the genus *Neocerura* Matsumura, 1929 has been described and illustrated. This species is closely related to *N. liturata* Walker, 1855 (type species) and completely conforms to the characterization of the genus. The wing maculation, larger size, and genitalic features make it distinct. The taxonomic account of *N. liturata* Walker, 1855 has also been included. The revival of the genus *Neocerura* Matsumura, 1929 has also been justified.

**Keywords:** *Neocerura convergata* sp. nov., *Neocerura liturata*, new species, Notodontidae.

**Abbreviations:** 1A—First anal vein | 2A—Second anal vein | AED—Aedeagus | CU<sub>1</sub>—First cubital vein | CU<sub>2</sub>—Second cubital vein | GN—Gnathos | JX—Juxta | M<sub>1</sub>—First Medial vein | M<sub>2</sub>—Second Medial vein | M<sub>3</sub>—Third Medial 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>—Subcosta and first radial vein | TG—Tegumen | UN—Uncus | VES—Vesica | VIN—Vinculum | VLV—Valva.

Matsumura (1929) established the genus *Neocerura* with *liturata* Walker as its type species. Gaede (1934), Kiriakoff (1964, 1968), Holloway (1983), Schintlmeister & Pinratana (2007), and Schintlmeister (2008) followed the same nomenclature. Schintlmeister (1997, 2001), and Wu & Fang (2002) treated it as subgenus under genus *Cerura* Shrank, 1802. Schintlmeister (2008) revived it

as a distinct genus and distinguished it from other two genera i.e., *Cerura* Shrank, 1802 and *Kamalia* Kocak and Kemal, 2006 on the basis of distinct male genitalic features. The distal end of aedeagus is simple in *Cerura* Shrank, 1802 and with sclerotized processes in *Kamalia* Kocak & Kemal, 2006 and but in the present genus, i.e., *Neocerura* its distal end is bifurcated. In the present studies, the same nomenclature has been adopted and *N. liturata* Walker, 1855 (the type species) along with a new species, namely, *N. convergata* has been described and illustrated in detail under this genus. The new species is closely related to *N. liturata* (Walker, 1855) but can be easily differentiated due to its bigger size and distinct black markings on wings. The male genitalia such as less curved uncus, narrower gnathos and converging distal processes of aedeagus further makes it a distinct species from other species of this genus. While dealing with Indonesian Notodontidae, Schintlmeister (2020) also added a new species, i.e., *N. longinquus* Schintlmeister, 2020 to the present genus and remarked that this genus is represented by five species.

### MATERIAL AND METHODS

The material examined was collected from different

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**Editor:** Jatishwor Singh Irungbam, Sphingidae Museum, Pribram, Czech Republic.

**Date of publication:** 26 November 2022 (online & print)

**Citation:** Kaleka, A.S. & R. Kumar (2022). A new species of genus *Neocerura* Matsumura, 1929 (Notodontidae: Lepidoptera) from India. *Journal of Threatened Taxa* 14(11): 22184–22189. https://doi.org/10.11609/jott.7481.14.11.22184-22189

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**Funding:** None.

**Competing interests:** The authors declare no competing interests.

**Acknowledgements:** The authors are thankful to the authorities of concerned states for providing permission, accommodation and other facilities during surveys.



localities of northeastern India by using vertical sheet method. The collected specimens were killed, stretched and preserved after proper labeling in Lepidoptera Lab, Punjabi University, Patiala. The external morphological characters were studied from the stretched specimens. The dissections were carried out to explore the male and female genitalic features (Robinson 1976). The permanent slides of fore and hindwings were prepared to study wing venation (Zimmerman 1978). The terminology for naming various genital parts follows Klots (1970).

## RESULTS & DISCUSSION

### Genus *Neocerura* Matsumura, 1929

*Neocerura* Matsumura, 1929, *Ins. Mats.*, 4: 89; Gaede, 1934, *Lep. Cat.*, 59: 60; Kiriakoff, 1964, *Genera Insectorum Fasc.*, 217a: 65; id., 1968, *Genera Insectorum Fasc.*, 217C: 113; Schintlmeister & Pinratana, 2007, *Moths of Thailand*, 5: 108; Schintlmeister, 2008, *Palaeartic Macrolepidoptera*, 1: 123.

*Neocerura* Kiriakoff: Holloway, 1983, *Moths of Borneo*, 4.

**Type species:** *Cerura liturata* Walker, 1855

**Distribution:** India (throughout), Nepal, Bangladesh, Myanmar, Sri Lanka, China, Taiwan, Indochina, Malaya, Borneo, Philippines, Sumatra, Java, Bali, Lombok, Flores, Sumba, Sumbawa, Sulawesi, Sumatra, Peleng Island, Salayer Island and as a remote point in Tanimbar (Holloway 1983; Schintlmeister & Pinratana 2007; Schintlmeister 2008, 2020).

**Diagnosis:** Small- to medium-sized moths; ground colour white with black markings. Labial palpi porrect. Antennae bipectinate, pectinations along entire length of the flagellum. Forewing with black wavy bands;  $M_3$  from lower angle of cell;  $M_2$  near middle of discocellulars;  $M_1$ - $R_3$  well stalked from upper angle of cell; areole present. Hindwing whitish. Legs hairy; fore-tibia with an epiphysis; mid-tibia and hind-tibia, each with a pair of tibial spurs. Male genitalia with uncus hood-like; gnathos petiolate; tegumen, vinculum and valvae weakly sclerotized; aedeagus small with distal end bifurcated.

### *Neocerura liturata* (Walker, 1855)

#### (Image 1–9)

*Cerura liturata* Walker, 1855, *List. Lep. Het. Br. Mus.*, 5: 988; Hampson, 1892, *Moths India*, 1: 155.

*Neocerura liturata* Walker: Matsumura, 1929, *Ins. Mats.*, 4: 89; Gaede, 1934, *Lep. Cat.*, 59: 60; Kiriakoff, 1964, *Genera Insectorum Fasc.*, 217a: 65; id., 1968, *Genera Insectorum Fasc.*, 217C: 113; Holloway, 1983, *Moths of Borneo*, 4; Schintlmeister and Pinratana,

2007, *Moths of Thailand*, 5: 108; Schintlmeister, 2008, *Palaeartic Macrolepidoptera*, 1: 123.

**Type locality:** Sylhet, Bangladesh

**Description:** Head with vertex white; frons black. Labial palpi porrect, dressed with black scales. Antenna bipectinate, pectinations along entire length of the flagellum; scape covered with white scales; flagellum black, pectinations black. Thorax, collar and tegula white, spotted with black; collar fringed with black scales; underside white. Legs hairy, covered with black and white scales; fore-tibia with an epiphysis; mid-tibia and hind-tibia, each with a pair of tibial spurs. Abdomen black having a whitish patch on distal end; underside white.

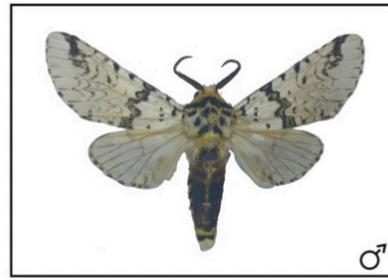
**Wing maculation:** Forewing with ground colour white; basal area with black spots; antemedial wavy black band; costa with black streaks; medial and postmedial regions with black wavy lines; a patch of black scales on costa near apex; margin banded with black and white cilia; underside white. Hindwing white with few black scales; outer margin banded with black and white cilia; underside white.

**Wing venation:** Forewing with discal cell more than half the length of the wing, closed; 1A from base of wing, anastomosing with 2A, covering one-third of anal margin; 2A from base of wing, reaching tornus; 3A absent;  $Cu_2$  beyond two-third of cell;  $Cu_1$  well before lower angle of cell;  $M_3$  from lower angle of cell;  $M_2$  above middle of discocellulars;  $M_1$ - $R_3$  well stalked from upper angle of cell;  $R_2$  before upper angle of cell, sending a bar to common stalk of  $R_5$ - $R_3$  to form an areole;  $R_1$  from three-fourth of cell, not reaching apex; Sc from base of wing, not reaching apex. Hindwing with discal cell more than half the length of wing, closed; 1A from base of wing, running parallel to anal margin, not reaching tornus; 2A from base of wing, reaching tornus; 3A absent;  $Cu_2$  beyond two-third of cell;  $Cu_1$  just before lower angle of cell;  $M_3$  from lower angle of cell;  $M_2$  just above middle of discocellulars;  $M_1$  and Rs well stalked from upper angle of cell; Sc+ $R_1$  from base of wing, sending a bar to cell before its middle, not reaching apex.

**Wing expanse:** Male: 38–50 mm; Female: Not examined.

**Body length:** Male: 24–26 mm.

**Male genitalia:** Uncus of moderate size, moderately sclerotized, setosed, distal half broad, curved, ventral side with a setosed projection, making snake-hood like appearance, distal end narrow, rounded; gnathos moderately sclerotized, more than half length of uncus, both projections robust, leaf-like; tegumen U-shaped, weakly sclerotized, each arm narrowing towards both



Actual Size

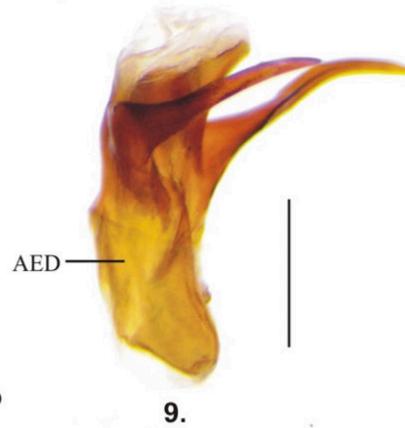
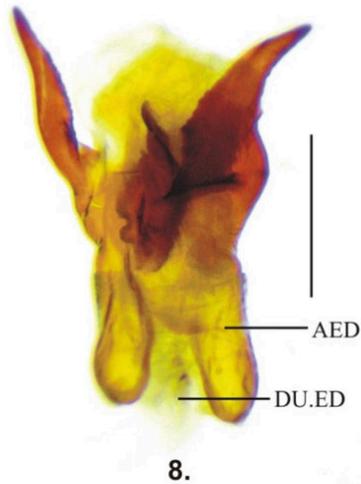
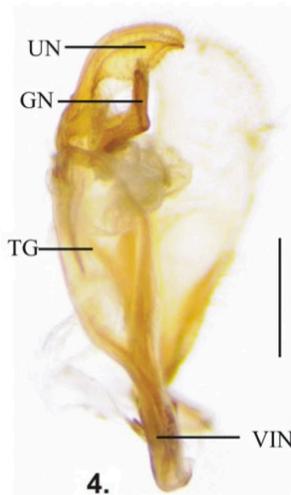
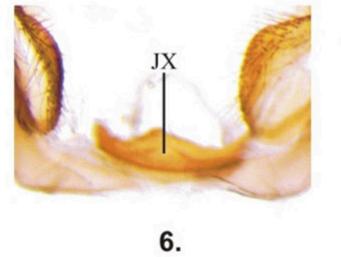
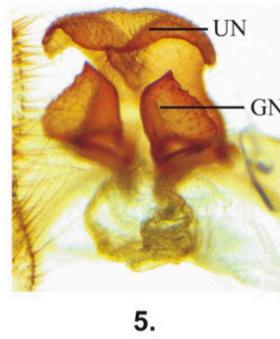
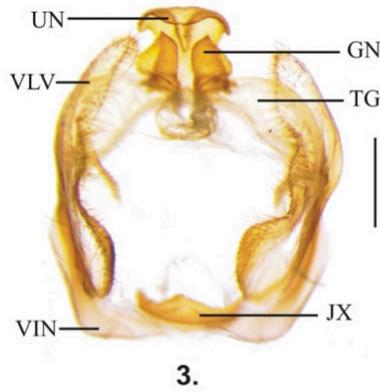
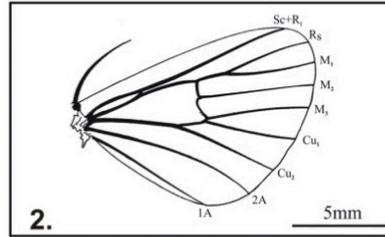
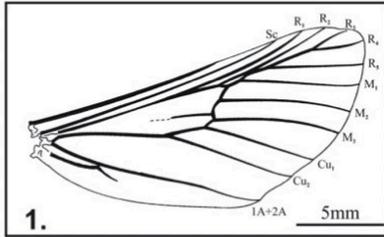


Image 1–9. *Neocerura liturata* (Walker, 1855).

1—Forewing | 2—Hindwing | 3—Male genitalia (ventral view) | 4—Lateral view | 5—Uncus & Gnathos | 6—Juxta | 7—Valva | 8 & 9—Aedeagus (bar line=1mm).

ends; vinculum narrow, weakly sclerotized, without any distinct saccus; juxta narrow, moderately sclerotized, crown-shaped. Valva simple, sleeper-shaped, weakly sclerotized, ventral half more setosed. Aedeagus short, well sclerotized; proximal end with flap-like structures on lateral sides; ductus ejaculatorius entering directly between these two flaps; distal half having highly sclerotized almost equal sized projections; vesica having long flap-like spur representing cornuti.

**Material examined:** India, Meghalaya: PUP-NT-29a-b, Umtor, 15.ix.2014, two males (25.8284° N, 91.8493° E); Mizoram: PUP-NT-29c, Thenzawl, 06.ix.2015, one male (23.2808° N, 92.7741° E); Sikkim: PUP-NT-29d, Dodak, 06.v.2014, one male (27.1734° N, 88.1708° E).

**Distribution:** India: Throughout India; Nepal, Bangladesh, Myanmar, Sri Lanka, China, Taiwan, Indochina, Malaya, Borneo, Philippines, Sumatra, Java, Bali, Lombok, Flores, Sumba; Sumbawa; Sulawesi; Sumatra, Peleng Island, Salayer Island (Holloway 1983; Schintlmeister & Pinratana 2007; Schintlmeister 2008, 2020).

**Remarks:** This species was originally described by Walker (1855) under genus *Cerura* Shrank and Hampson (1892) followed the same nomenclature. Matsumura (1929) established a new genus *Neocerura* for its proper placement and the same has been followed in the present studies.

#### *Neocerura convergata* sp. nov.

(Image 10–19)

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**Material examined:** Holotype: PUP-NT-28a, 11.v.2013, male, India, Arunachal Pradesh, Sessa (27.1074° N, 92.5254° E).

Paratypes: PUP-NT-28b, 11.v.2013, one male, India, Arunachal Pradesh, Sessa (27.1074° N, 92.5254° E); PUP-NT-28c-d, 08.ix.2013, three males, Sikkim, Golitar (27.2299° N, 88.4933° E).

**Diagnosis:** The wing maculation and genitalic features particularly the shape and size of uncus, gnathos, aedeagus, and distal processes of aedeagus makes it distinct from other known species of genus *Neocerura*. Forewing with 31 mm length, distinctly marked medial and postmedial fascia, median fascia with costal streak to postmedial lines and hindwing with costal region having black patches are the main diagnostic features of the present species. The splendid white colour of forewing with more prominent medial spot and medial fascia without any costal streak to postmedial lines differentiates *N. thomsai* Schintlmeister from

it. The absence of brown filled antemedial fascia with a black spot near dorsum and discal spot of forewing differentiates the present species from *N. multifasciata* Schintlmeister and *N. longinquus* Schintlmeister respectively. Male genitalia is with wedge shaped gnathos which is quite robust in *N. liturata* Walker and *N. longinquus* Schintlmeister. The distal bifurcate processes of aedeagus are of moderate breadth with rounded apices whereas these are broader in *N. longinquus* Schintlmeister and narrower in other species. The distal processes are quite narrower and longer with pointed apices in *N. multifasciata* Schintlmeister than in all other species.

**Description:** Head with vertex white; frons black. Labial palpi porrect, dressed with black scales. Antenna bipectinate along entire length of the flagellum; scape covered with white scales; flagellum black, pectinations black. Thorax, collar and tegula white; thorax and tegula spotted with black; underside whitish with few black scales. Legs hairy, covered with black and white scales; fore-tibia with an epiphysis; mid-tibia and hind-tibia, each with a pair of tibial spurs. Abdomen black with white median streak; distal end with a white patch having a black ring on it; underside white.

**Wing maculation:** Forewing with ground colour white; basal area with small black streaks; costa with black streaks; a postmedial wavy band; medial and postmedial regions with black wavy lines; veins black in marginal area; a black patch on costa near apex; outer margin chequered with black and white cilia; underside whitish with almost same pattern as on upper side. Hindwing white; costal region having black patches; anal area with few black scales; outer margin banded with black and white cilia; underside whitish.

**Wing venation:** Forewing with discal cell more than half the length of the wing, closed; 1A from base of wing, anastomosing with 2A, covering one-third of anal margin; 2A from base of wing, reaching tornus; 3A absent; Cu<sub>2</sub> just beyond three-fourth of cell; Cu<sub>1</sub> before lower angle of cell; M<sub>3</sub> from lower angle of cell; M<sub>2</sub> well above middle of discocellulars; M<sub>1</sub> from upper angle of cell; R<sub>5</sub> to R<sub>3</sub> stalked before upper angle of cell, their common stalk anastomosing with M<sub>1</sub> to form a small areole; R<sub>1</sub> well before upper angle of cell, not reaching apex; Sc from base of wing, not reaching apex. Hindwing with discal cell more than half the length of wing, closed; 1A from base of wing running parallel to anal margin, not reaching tornus; 2A from base of wing, reaching tornus; 3A absent; Cu<sub>2</sub> well before lower angle of cell; Cu<sub>1</sub> and M<sub>3</sub> minutely stalked from lower angle of cell; M<sub>2</sub> from middle of discocellulars; M<sub>1</sub> and Rs well stalked from



0.75 of Actual Size

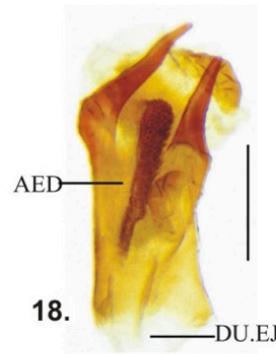
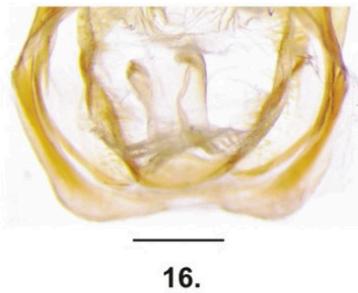
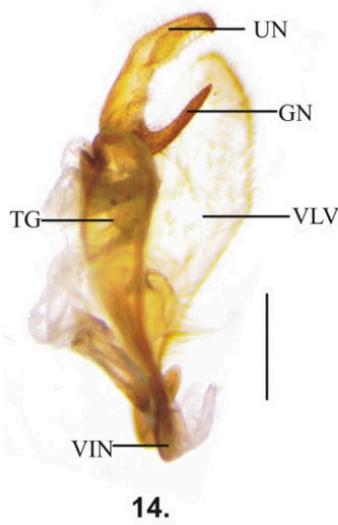
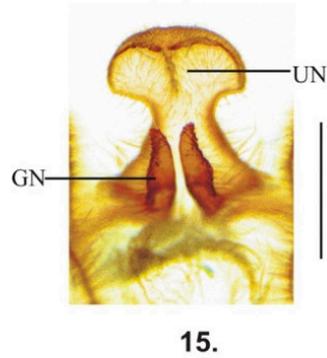
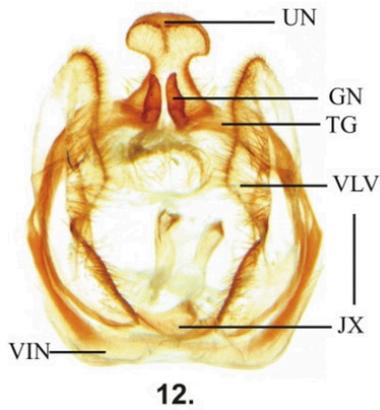
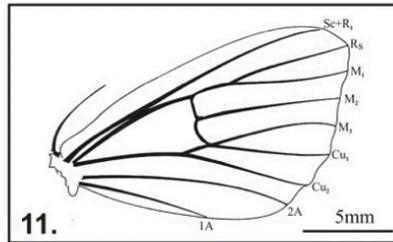
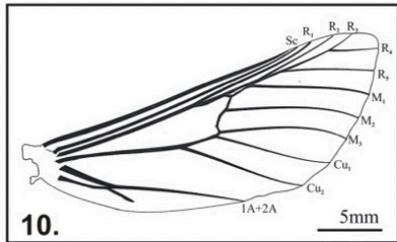


Image 10–19. *Neocerura convergata* sp. nov. 10—Forewing | 11—Hindwing | 12—Male genitalia (ventral view) | 13—Dorsal view | 14—Lateral view | 15—Uncus & Gnathos | 16—Juxta | 17—Valva | 18 & 19—Aedeagus (bar line=1mm).

Key to the studied species of genus *Neocerura* Matsumura, 1925:

1. Wings weakly marked with black. Male genitalia with gnathos robust leaf-like; aedeagus with distal processes diverging outwardly ..... *Neocerura liturata* Walker, 1855  
 - Wings distinctly marked with black. Male genitalia with gnathos narrow, wedge-shaped; aedeagus with distal processes converging inwardly ..... *Neocerura convergata* sp. nov.

upper angle of cell; Sc+R<sub>1</sub> from base of wing, conjoined in middle of discal cell, not reaching apex.

**Wing expanse:** Male: 66 mm; Female: not examined.

**Body length:** Male: 23 mm.

**Male genitalia:** Uncus of medium size, weakly sclerotized, setosed, proximal half narrow, distal half laterally dilated making globular appearance, slightly curved near narrow and blunt tip; gnathos narrow, wedge-shaped, moderately sclerotized, dorsally setosed, both projections narrow, almost half the length of uncus, outer walls corrugated; tegumen broad, U-shaped, weakly sclerotized, narrowing towards vinculum; vinculum narrow, slightly produced proximally on both sides, saccus absent; juxta oblong in shape, weakly sclerotized, proximal area with sclerotized triangular projection. Valva simple, weakly sclerotized, setosed; proximal half narrow, distal half broad with rounded apex. Aedeagus small, well sclerotized; ductus ejaculatorius entering from proximal end; distal end with two finger-like, highly sclerotized projections with rounded apices; vesica with a large prominent nail-like sclerotized patch having dentate walls representing cornuti.

**Distribution:** India: Arunachal Pradesh, Sikkim

**Etymology:** The present species has been named after the converging distal processes of aedeagus.

**Bionomics:** It is known only by five specimens from two localities, i.e., Sessa and Golitar in the states of Arunachal Pradesh and Sikkim.

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ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

November 2022 | Vol. 14 | No. 11 | Pages: 22039-22206

Date of Publication: 26 November 2022 (Online & Print)

DOI: 10.11609/jott.2022.14.11.22039-22206

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