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Two new species of genus *Zadadra* Moore (Lepidoptera: Erebidae: Arctiinae) from India

Rahul Joshi[1,*], *Jagbir Singh Kirti*[2], *and Navneet Singh*[3]

Abstract

Two new species of Lithosiini (Lepidoptera: Erebidae: Arctiinae), *Zadadra cucullata* **sp. nov.,** and *Zadadra neodistorta* **sp. nov**., are described from India. In addition, a dichotomous key to all the *Zadadra* Moore species is given.

Key Words: Lithosiini, *Zadadra*, new species, external genitalia, dichotomous key

Resumen

Se describen dos nuevas especies de Lithosinii (Lepidoptera: Erebidae: Arctiinae), *Zadadra cucullata* **sp. nov**. y *Zadadra neodistorta* **sp. nov**., de la India. Además, se provee una clave dicotómica para todas las especies del género *Zadadra* Moore.

Palabras Clave: Lithosiini, *Zadadra*, nuevas especies, genitales externos, clave dicotómica

Moore (1878) erected the monotypic genus *Zadadra* to accommodate *Lithosia distorta* Moore, 1872 from Darjeeling (India). Hampson (1894) treated *Zadadra* as a junior synonym of *Prabhasa* Moore, and subsequently *Eilema* Hübner (Hampson, 1900), respectively, and Strand (1922) followed the latter placement. Daniel (1954) resurrected the genus *Zadadra* Moore with sole included species, *distorta* Moore and extended its known distribution range into China. Arora & Chaudhary (1982) also considered *Zadadra* as a distinct and monotypic genus. Fang (2000) transferred three species to the genus: *Prabhasa fuscistriga* (Hampson, 1894), *P. plumbeomicans* (Hampson, 1894), and *P. costalis* (Moore, 1878) and also diagnosed the male genitalia of *Z. distorta* Moore. However, Holloway (2001) synonymized the genus with *Eilema* Hübner, whereas Černý & Pinratana (2009) treated it as synonym of *Prabhasa* Moore. Once again, Dubatolov & Zolotuhin (2011) resurrected *Zadadra* and transferred *Z. plumbeomicans* (Hampson) to the genus *Prabhasa.* So presently, the genus *Zadadra* Moore includes three species, Z. *distorta* Moore, Z. *fuscistriga* (Hampson) and Z. costalis (Moore, 1878). In this paper, we describe two new species, *Z. cucullata* **sp. nov.** and *Z. neodistorta* **sp. nov.**, bringing the total number of included species to five. Both the new species are closely allied to the type of *Zadadra* Moore, but are distinct due to the characters discussed in remarks. The photographs of adult and male genitalia of *Z. distorta* Moore is provided for comparison. A dichotomous key to the known *Zadadra* species is also given.

Materials and Methods

The studied material was collected using a vertical sheet light trap. The collected specimens were processed using standard techniques in lepidopterology. Klots (1970) and Robinson (1976) were followed for the study of genitalia. Adult moths were photographed using a digital camera, and photography of male genitalia was undertaken with the help of an Image Processing Unit (Leica M205A fitted with a Leica DFC 500 digital camera). The identification of *Z. distorta* (Moore) (Fig. 11-13) is confirmed by comparing our specimens with the photograph of its syntype received from Dr. Alessandro Giusti, Curator – Lepidoptera, NHM, London (Fig. 14) and comparison of male genitalia with figures of Fang (2000) and Dubatolov & Zolotuhin (2011). The holotypes and all paratypes of the new species are deposited in the Department of Zoology & Environmental Sciences Museum, Punjabi University, Patiala, Punjab, and have been allotted registration numbers as noted under each species.

ABBREVIATIONS

We used the following abbreviations: AED: Aedeagus, CU: Cucullus, DU.EJ: Ductus ejaculatorius, JX: Juxta, PUP/ RJ: Punjabi University, Patiala/ Rahul Joshi collection, SA: Saccus, SL: Sacculus, SL.: Saccular projection, TG: Tegumen, UN: Uncus, VES: Vesica, VIN: Vinculum, VLA: Valvula.

Results and Discussion

Genus *Zadadra* Moore
Moore, 1878, Proc. Zool. Soc. London 1878: 25.

TYPE SPECIES

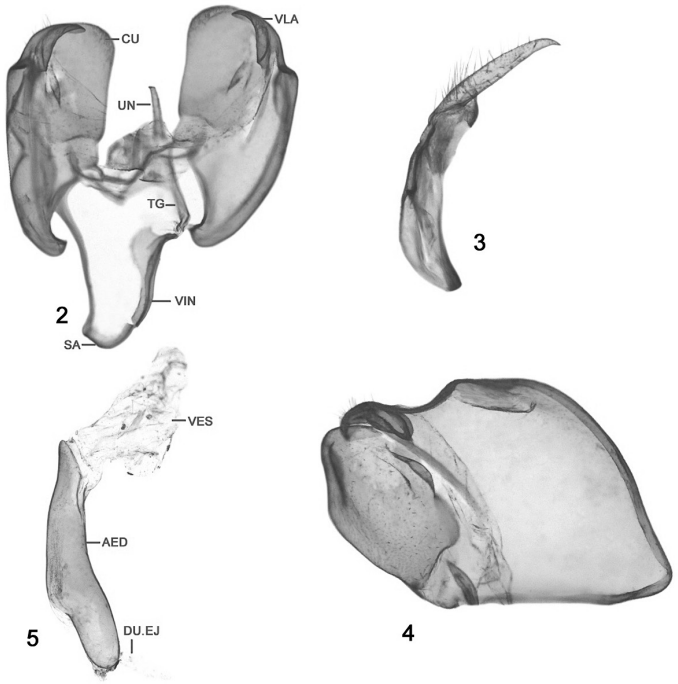
Lithosia distorta Moore, 1872 (by monotypy)

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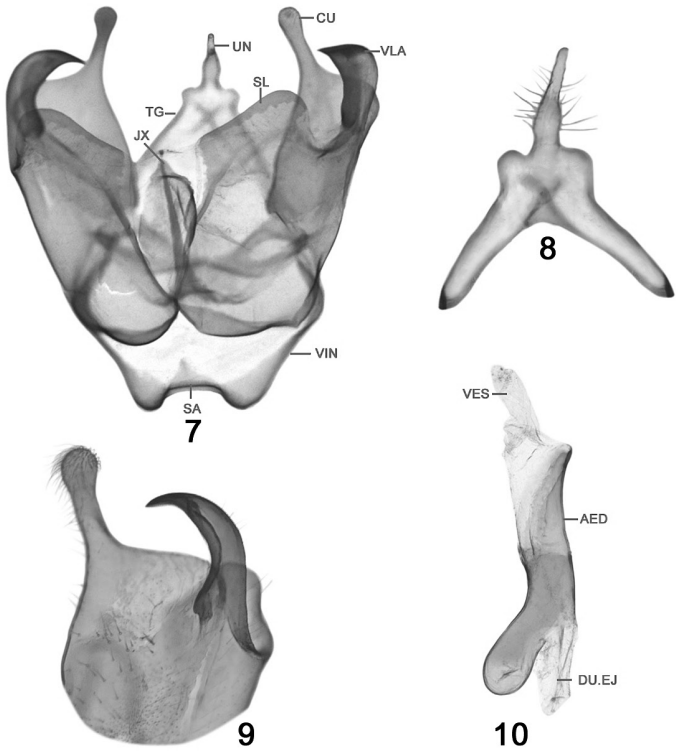
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Figs. 1–5. *Zadadra cucullata* **sp. nov.** 1, Adult male. 2, Male genitalia. 3, Uncus with Tegumen. 4, Valva. 5, Aedeagus.



Figs. 6–10. ***Z****adadra neodistorta* **sp. nov.** 6, Adult male.7, Male genitalia.8, Uncus with Tegumen. 9, Valva.10, Aedeagus.

DISTRIBUTION

India, China, Thailand, Vietnam, Nepal.

DIAGNOSIS

Genus *Zadadra* Moore is closely allied to genus *Prabhasa* Moore. The main synapomorphic characters for both the genera are reduced juxta and transtilla forming an arch above aedeagus. But are distinct due to uncus long and narrow and sacculus and cucullus wide in *Zadadra* Moore and uncus slightly S-curved; sacculus almost fused by their ventral edges, their apices upturned; cucullus noticeably shorter than sacculus in *Prabhasa* Moore (Dubatolov & Zolotuhin, 2011).

Zadadra cucullata Joshi, Kirti & Singh **sp. nov.** (Figs. 1–5)

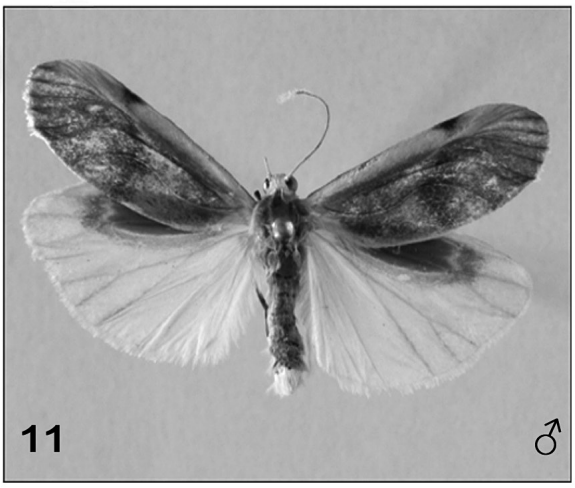
DIAGNOSIS

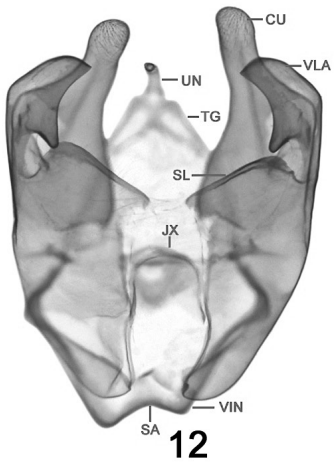
MALE: *Adult* (Fig. 1). Head with frons yellow; vertex brown. Antennae greyish- yellow. Labial palpi with tip black. Thorax with patagia and tegulae grey. Forewing fuscous grey; costa yellowish towards base; a groove above cell; indistinct medial band. Hindwing pale yellow with terminal area pale fuscous, androconial patch from antemedial to medial region. Abdomen grey with ventral surface and anal tuft yellow.

Male genitalia (Fig. 2, 3). Uncus slender, broad at base, narrow towards apex; tegumen as long as uncus, broad U-shaped; vinculum longer than tegumen, deep, U-shaped; saccus knob-like. Valvae **(**Fig. 4) broad, extending much beyond uncus; cucullus broad, lamellate; sacculus broad, valvula short, curved; a small harpe present. Transtilla membranous. Aedeagus (Fig. 5) moderately long, slightly curved, apically narrow with a short spine; vesica membranous, cornutus absent; ductus ejaculatorius entering laterally.

Wing span. Male 34-36 mm.

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Figs. 11–13. *Zadadra distorta* (Moore)11, Adult male. 12, Male genitalia. 13, Aedeagus.

FEMALE: UNKNOWN.

MATERIAL EXAMINED

HOLOTYPE: 1 male INDIA. Nagaland, Tuenseng, 1600 m, 03.V.2010. (Registration number: PUP/RJ –141). PARATYPES: 3 males INDIA. Sikkim, Aritar, 1400 m, 30.IV.2009 -3♂ (Coll. R Joshi). (Registration numbers: PUP/RJ –142a; PUP/RJ –142b; PUP/RJ –142c)

DISSECTED SPECIMEN: PUP/RJ –142a; Slide no. Gen. ♂ PUP/RJ –142a

TYPE LOCALITY

Tuensang (Nagaland, India)

ETYMOLOGY

The name of the new species refers to its distinct shape of cucullus.

REMARKS

Morphologically, the new species differs from *Z. distorta* (Moore) and *Z. neodistorta* **sp. nov.** in the absence of a post medial spot and a yellow fascia on the forewing costa. The male genital features of a broad and lamellate cucullus and the presence of a harpe also separates *Z. cucullata* **sp. nov.** from *Z. neodistorta* **sp. nov.** and *Z. distorta* Moore. Furthermore, *Z. cucullata* **sp. nov.** is distinct from *Z. costalis* (Moore) and *Z. fuscistriga* (Hampson) in the presence of an androconial patch on hindwing.

Zadadra neodistorta Joshi, Kirti & Singh **sp. nov.** (Figs. 6–10)

DIAGNOSIS

Male

Adult (Fig. 6). Head with frons blackish; vertex dull orange. Antennae black, base yellow. Labial palpi black at tips. Thorax with patagia and tegulae grey. Forewing fuscous grey; costal area ochreous, suffused with fulvous; a costal spot beyond middle, with an obscure obliquely curved fuscous band from the spot to inner margin; inner margin narrowly ochreous, termen obtuse. Hindwing pale yellow, tinged with fuscous towards apex; androconial patch fuscous, not reaching beyond discal cell. Abdomen grey with ventral surface and anal tuft orange.

Male genitalia (Fig. 7, 8 and 9). Uncus swollen at base, tip blunt, sparsely setosed; tegumen longer than uncus, inverted V-shaped; vinculum broad, shorter than tegumen; saccus wide and rounded. Valvae with costa linear; cucullus like halters; valvula sclerotized, sickle shape; sacculus shorter than costa, saccular process broad and elevated in front. Juxta strong spine like; transtilla sclerotized, eye-like. Aedeagus (Fig. 10) slightly S shape; vesica membranous without cornuti; ductus ejaculatorius entering laterally.

Wing span. Male 38 mm

FEMALE: UNKNOWN.

MATERIAL EXAMINED

HOLOTYPE: 1 male INDIA. Sikkim, Rongli, 1400 m, 05.V.2009. (Registration number: PUP/RJ – 143a). PARATYPES: 2 males INDIA. Sikkim, Rongli, 1400 m, 05.V.2009 - 2♂. (Coll. R Joshi). (Registration numbers: PUP/RJ – 143b; PUP/RJ – 143c)

DISSECTED SPECIMEN: PUP/RJ –143a; Slide no. Gen. ♂ PUP/RJ –143a

TYPE LOCALITY

Rongli (Sikkim, India)

ETYMOLOGY

Name of the species pertains to its allied species, *Z. distorta* (Moore).

REMARKS

Morphologically, *Z. neodistorta* **sp. nov**., resembles *Z. distorta* (Moore) but can be differentiated by the presence of a narrow costal fascia on the forewing, and the smaller androconial patch on the hindwing of the males. The distinct male genital features of *neodistorta* **sp. nov**. are: cucullus halter like and the saccular process is sickle shaped, without any projection on the inner side. Whereas, in *Z. distorta* Moore the cucullus is uniformly broad & tube- like and the saccular process is short and thick with a projection on the inner side. The new species also differs from *Z. cucullata* **sp. nov**. in the presence of a costal spot on the forewing (absent in *Z. cucullata*). Furthermore, the presence of an androconial patch on the hindwing of the male separates it from the other two species, *Z. costalis* (Moore) and *Z. fuscistriga* (Hampson).

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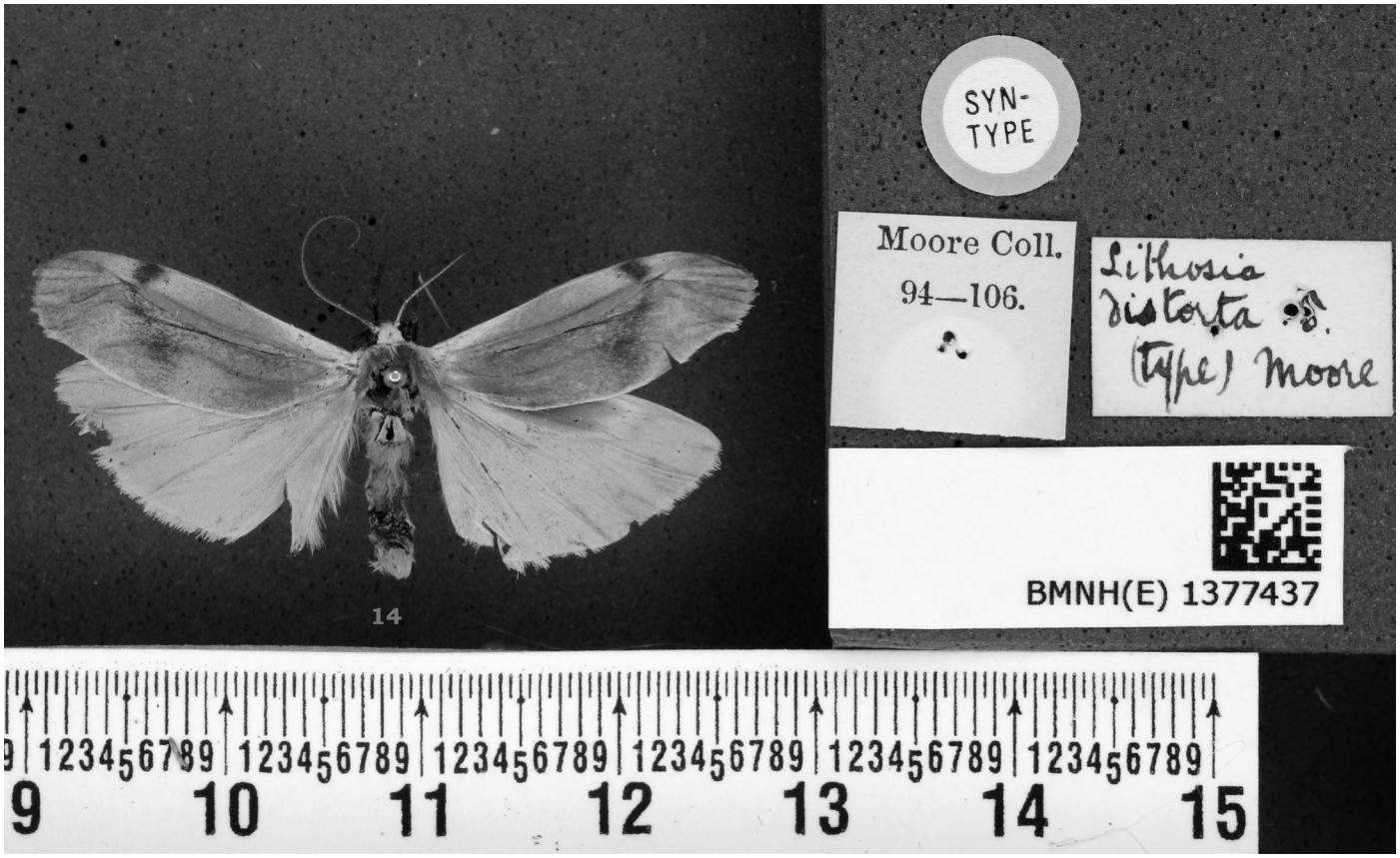


Fig. 14. *Zadadra distorta* (Moore) Syntype ♂.

An updated key to the known species of *Zadadra* Moore

1. Hindwing of male with an androconial patch 2

—. Hindwing of male without androconial patch 4

2. Forewing without post medial costal spot; male genitalia with cucullus broad and flap like . . . . . *Z. cucullata* **sp. nov.**

—. Forewing with post medial costal spot; male genitalia with cucullus narrow and rod like 3

3. Hindwing with androconial patch short; male genitalia with cucullus halter like and valvula sclerotized, sickle-shape, without any projection on inner side . . . . . *Z. neodistorta* **sp. nov.**

—. Hindwing with androconial patch long; male genitalia with cucullus uniformly thick and valvula short, thick with a projection on inner side . . . . . *Z. distorta* (Moore)

4. Forewing with post medial costal spot; male genitalia with uncus broad at base narrowing towards tip, distal saccular process smooth and slightly curved . . . . . *Z.costalis* (Moore)

—. Forewing without post medial costal spot; male genitalia with uncus swollen at tip, distal saccular process of valvae wavy and strongly angled . . . . . *Z. fuscistriga* (Hampson)

Acknowledgments

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