Review of the genus *Calonola* László, Ronkay & Witt, 2010 with description of a new species (Lepidoptera, Nolidae, Nolinae)

GYULA M. LÁSZLÓ¹,², GÁBOR RONKAY² & LÁSZLÓ RONKAY²,³

¹12 Rainbow Street, Leominster, HR6 8DQ, United Kingdom; E-mail: gyula.m.laszlo@gmail.com
²Heterocera Press Ltd., H-1137 Budapest, Szt. István krt. 4, Hungary; E-mail: gaborronkay@gmail.com
³Hungarian Natural History Museum, H-1088 Budapest, Baross u. 13, Hungary; E-mail: laszlo.ronkay@gmail.com

Corresponding author

Received 17 January 2020  |  Accepted by V. Pešić: 23 February 2020  |  Published online 2 March 2020.

Abstract
A new species of the Nolini genus *Calonola* László, Ronkay & Witt, 2010, *Calonola theresiae* sp. n., is described. A revised check list of the taxa of the genus is given. With 8 colour and 9 black and white figures.

Key words: Nolini, South East Asia, Oriental Region.

Introduction

The genus *Calonola* was established by László, Ronkay & Witt (2010) for the conspicuous and rather detached species, *Zia ectrocta* Hampson, 1907, which had been treated earlier as member of the genus *Aquita* Walker, 1863 as *Zia* Walker, 1863 is a mere synonym of *Aquita*. Due to the similar external habitus and the genital morphology, *Pisara argyria* Hampson, 1894 has also been placed into *Calonola* by László et al. in the same article (2010). Later, a further species, *Barnanola orbiculata* László, Ronkay & Witt, 2010 has been transferred to the genus (László et al. 2013).

During the identification of the Nolinae material of the Hungarian Natural History Museum and the private collections of the senior and second authors, three female specimens from Central Vietnam, 5 males and 2 females from South Laos, and a female from North Thailand reminding to *C. argyria* were found. The examination of the copulatory organ of this taxon revealed that their distinctive external habitus is combined with significant differences in genital morphology comparing with those of *C. argyria*, *C. ectrocta* and *C. orbiculata*. Thus, the specimens from Vietnam, Laos and Thailand represent the fourth known species of the genus which is described in the present paper as new to science.
Material and Methods

The genital apparatuses were dissected, stained with Eosin red and mounted in Euparal on microscope slides applying standard methods of preparation (Lafontaine & Mikkola 1987). Photos of adults were taken using a Nikon D90 camera equipped with Nikkor AF Micro 60 mm lens. The genitalia dissections and mountings have been carried out using Nikon SMZ745 and Wild M7A stereomicroscopes. The genitalia photographs have been taken using a Nikon Eclipse 80i compound microscope connected to a Nikon DS-Fi1 digital camera, by courtesy of Martin Lödl and Sabine Gaal-Haszler (NHMW).

Explanation of the abbreviations used
HNHM – Hungarian Natural History Museum, Budapest, Hungary.
LGN – genitalia slides of Nolidae prepared by Gyula M. László.
MHNG – Natural History Museum, Geneva (Museum d’Histoire Naturelle, Genève), Switzerland.
MWM – Museum Witt, Munich, Germany.
NHMUK (formerly BMNH) – The Natural History Museum (formerly British Museum, Natural History), London, United Kingdom.
NHMW – Natural History Museum, Vienna (Naturhistorisches Museum Wien), Austria.
RL – genitalia slides prepared by László Ronkay.
ZSM – Bavarian State Collection of Zoology, Munich (Zoologische Staatssammlung München, Germany.

Taxonomic part

Genus Calonola László, Ronkay & Witt, 2010
Calonola László, Ronkay & Witt, 2010, Esperiana 15: 23.
Type-species: Zia ectrocta Hampson, 1907, by original designation.

Species content of the genus with updated information on distribution:

Calonola ectrocta (Hampson, 1907) (Figs 5, 6, 10, 15)
Zia ectrocta Hampson, 1907, Annals and Magazine of Natural History 7(19): 229.
Type-locality: [Sri Lanka] Ceylon, W-Haputale. Holotype: male, in coll. NHMUK (examined, László et al. 2010).

Additional material examined: India. 1 male, W. Bengal, Purulia, Aug. 1968, G. Pallesen ex coll. Zoological Museum, Copenhagen, slide No.: LGN 391 (HNHM). Sri Lanka. 1 male, “Zia ectrocta ab. ectroctoides Holotype Strand” (manuscript name), “Maskeliya, Ceylon, May, de Monbray, 1906-181”, slide No.: LGN 723 (BM Noctuidae 18203) (NHMUK). Nepal. 1 male, Trisuli valley, 900m, cca 20 km NE Trisuli, 85°12’E, 28°03’N, 27.III.1995, leg. Gy.M. László & G. Ronkay, slide No.: LGN 894 (MWM/ZSM); 1 female, Janakpur, Dolakha, Jiri, 2,350m, 30.xii.1993, K. Suzuki leg. (NHMUK). Thailand. 1 male, Prov. Chiang Rai, 1 km SE of Khun-Kon, 600m, 15.XI.1998, leg. T. Csövári & L. Mikus, slide No.: LGN 156; 1 female, Prov. Nan, 25 km N of Bo Luang, 1150m, 3.II.2000, leg. M. Hreblay & A. Szabó, slide No.: LGN 893; 1 female, Prov. Chiang Mai, 1600m, between Fang and Nor Læ, 99°06’E, 20°02’N, 28.X.2002, leg. B. Herczig & G. Ronkay (MWM/ZSM). Indonesia, Sumatra. 1 male, Prapat, HW3, 18.IX.1982, leg. Dr. Diehl, slide No.: LGN 2929 (HNHM).

Distribution. Sri Lanka, India, Nepal, Thailand, Sumatra.

Calonola argyria (Hampson, 1894) (Figs 1, 2, 9, 12)
Pisara argyria Hampson, 1894, Fauna of British India. Moths 2: 145.
Type-locality: [India] Sikkim. Holotype: male, in coll. NHMUK (examined, László et al. 2010).
**Additional material examined. Nepal.** 1 male, Koshi, Taplejung area, SW of Mamankhe, 1700m, 87°57'E, 27°26'N, 6-7.IV.1996, leg. Csorba & Ronkay, slide No.: LGN114; 1 female, Koshi, Taplejung area, Tapethok, 1600m, 87°52'E, 27°32'N, 2.IV.1996, leg. G. Csorba & S.T. Kovács, slide No.: LGN 117 (MWM/ZSM).

**Myanmar.** 1 male, Putao, 500m, 23.05.1998, leg. Murzin & Siniaev, slide No.: LGN 1041 (MWM/ZSM).

**Thailand.** 1 male, Prov. Chiang Mai, Mt. Doi Phahompok, 18 km NW of Fang, 2100m, 25.II.1998, leg. M. Hreblay & Cs. Szabóky, slide No.: LGN165 (MWM/ZSM).

**Laos.** 1 female, Prov. Muang Cha, Saysomboune, 1300m, 18°54’N, 103°08’E, 22-23.X.2008, leg. local collector (coll. G. Ronkay).

**Distribution.** India, Nepal, Myanmar, Thailand, Laos.

**Calonola orbiculata** (László, Ronkay & Witt, 2010) (Figs 7, 8, 16, 17)

Barnanola orbiculata László, Ronkay & Witt, 2010, Esperiana 15: 11, pl. 1, figs 10-11; gen. fig. 7.

Type-locality: Thailand, Prov. Mae Hong Song, 1 km S of Bahundanda, 1000 m. Holotype: female, in coll. MWM/ZSM.

**Additional material examined. Laos.** 5 females, Champasak prov., 27 km ENE of Pakse, near Tad Fane waterfall, N15°11'01.1'' E106°07'40.5'', 950m, border of primary forest, 17–28.VIII.2017, A.V. Volynkin & M.S. Ivanova leg., slide Nos: LGN 2921, 2922 (coll. Gy M. László).

**Distribution.** Thailand, Sumatra, Laos.

**Calonola theresiae** László, Ronkay & Ronkay sp. n. (Figs 3, 4, 11, 13, 14)

**Description of the new species**

**Calonola theresiae sp. n.**

(Figs 3, 4, 11, 13, 14)

https://zoobank.org/urn:lsid:zoobank.org:act:3A8EA2D7-16CA-489A-A89C-EFFB7591094F

**Holotype.** female, “Vietnam, Lam Vien Plato, Nui Ba NP, 12°10’N, 108°40’E, 1500 m, 9-18.XI.2008”, slide No.: RL11321f (coll. MHNG).

**Paratypes. Vietnam.** 2 females, with the same data as the holotype, slide No.: RL11322 (coll. G. Ronkay).

**Laos.** 2 males, 1 female, Champasak prov., 27 km ENE of Pakse, near Tad Fane waterfall, N15°11’01.1” E106°07’40.5”, 950m, border of primary forest, 3–16.VIII.2017, A.V. Volynkin & M.S. Ivanova leg., slide No.: LGN 2920 (female); 3 males, 1 female, same site, but collected between 17-28.VIII.2017, slide No.: LGN 2919 (male). **Thailand.** 1 male, Chiang Mai prov., Thong Chai Range, near Doi Suthep-Pui National Park, 18°54’22.91”N, 98°51’34.76”E, 800 m, primary forest, 24–30.VII.2017, A.V. Volynkin & M.S. Ivanova leg., slide No.: LGN 2930 (coll. Gy.M. László).

**Diagnosis.**

The external appearance of *Calonola theresiae* sp. n. is most similar to that of *C. argyria* (Hampson, 1894) but the new species is easily distinguishable from its sister species by the following characters: *C. theresiae* has neutral white head, thorax and forewing, without intense silvery sheen which is typical of *C. argyria*, the postmedial line is more perpendicular to inner margin and its upper third is stronger curved inwards to large dark costal patch, the lower section of marginal field is more greyish-brown shaded, with more angulate subterminal line, the distance between postmedial and subterminal line is remarkably larger in the tornal area than in *C. argyria* where these two lines run very close and parallel towards inner margin; last but not least, the hindwing of the new species is considerably darker than that of *C. argyria*.

In the male genitalia, the new species differs clearly from *C. argyria* by its considerably shorter and slimmer uncus, somewhat shorter, medially broader valva, conspicuously shorter harpe and much broader vinculum without a long, narrow medial process which is characteristic for *C. argyria*; in addition, the new species has somewhat shorter and broader aedeagus comparing with that of *C. argyria* with the vesica bearing a much smaller, rather thumback-like cornutus, whereas the cornutus of *C. argyria* is much longer, more robust, thorn-like.
Figure 1-8. Adults: 1 Calonola argyria holotype male, India, Sikkim; 2 Calonola argyria female, Nepal; 3 Calonola theresiæ sp. n., paratype male, Laos; 4 Calonola theresiæ sp. n., holotype female, Vietnam; 5 Calonola ectrocta male, Thailand; 6 Calonola ectrocta female, Thailand; 7 Calonola orbiculata holotype female, Thailand; 8 Calonola orbiculata paratype female, Indonesia, Sumatra.
Figures 9-11. Genitalia figures: 9 Calonola argyria male Nepal, LGN114; 10 Calonola ectrocta male India, LGN391; 11 Calonola theresiae sp. n. paratype male Laos LGN2919.
12. *Calonola argyria* (Hampson, 1894)

13. *Calonola theresiae* sp. n.

14. *Calonola theresiae* sp. n.

**Figures 12-14.** Genitalia figures: 12 *Calonola argyria* female Nepal LGN117; 13 *Calonola theresiae* sp. n. holotype female Vietnam RL11321; 14 *Calonola theresiae* sp. n. paratype female Laos LGN2920.
15. *Calonola ectrocta* (Hampson, 1907)

16. *Calonola orbiculata* (László, Ronkay & Witt, 2010)

17. *Calonola orbiculata* (László, Ronkay & Witt, 2010)

**Figures 15-17.** 15 *Calonola ectrocta* female Thailand LGN893; 16 *Calonola orbiculata* holotype female Thailand LGN146; 17 *Calonola orbiculata* paratype female Indonesia, Sumatra LGN435.
The differences between the two species are also well expressed in the configuration of the female genitalia, as the new species has significantly, in comparison with *C. argyria*, longer and somewhat narrower, membranous ductus bursae (that is sclerotized in its distal part in *C. argyria* with a distinct lateral protrusion), remarkably smaller corpus bursae and considerably larger pair of elongate signum bursae.

**Description.**

*Adult* (Figs 3, 4). Forewing length of males 9–9.5 mm, that of females 10–10.5 mm. Head relatively large, palpi well developed; frons and vertex neutral white; compound eyes moderately large, globular; male antennae sparsely fasciculate, that of females filiform. Sexual dimorphism expressed only by the slightly different sizes of males and females. Thorax uniformly neutral white; abdomen white, ringed dorsally with brown-grey or plumbeous grey; last two abdominal segments almost entirely brownish-greyish. Forewing moderately long and broad, apically rounded, costal margin slightly convex in its apical third, outer margin gently arcuate, ventral margin nearly straight. Forewing ground colour dull-white, with short, elliptical blackish costal basal spot, large subtriangular/semilunar dark brown costal patch; marginal area suffused with somewhat greyish shaded brown except at termen. Subbasal and basal lines deleted; antemedia line very thin, blackish-brown, medially sharply angled, its ventral section weakly, medial angle and costal section sharply defined. Median area with sparse brown iroration; orbicular stigma small, rounded, blackish brown; claviform stigma cuneate black; median fascia obsolete, shadow-like, represented by a few darker brown scales; postmedial line sharply defined, blackish-brown, only slightly wavy, and rather perpendicular to inner margin but curved inwards at vein m₂ and between the cubital veins. Apical third of costa with three narrow dark grey patches, apex creamy white; subterminal line wide, diffuse, dark brown followed by whitish at outer side, upper section more indistinct, lower two-thirds stronger and wavy, running rather far from postmedial line at tornus. Terminal line fine, continuous, dark brown; cilia very long, brown, with fine white basal line, and chequered with darker brown squares. Hindwing pale brown basally, gradually darkened towards apex, apex dark brown; cilia pale brown.

*Male genitalia* (Fig. 11). Uncus rather long and narrow, apical third heavily sclerotized, relatively short, slightly arched, gradually tapered, apically pointed, beak-like; subscaphium narrow, elongate, membranous with gently arcuate moderately sclerotized lateral margins; tegumen short and narrow; transstilae very thin, pointed stick-like; fultura inferior (juxta) short and narrow, shield-like; valva medium long, medially slightly dilated, ventral margin sclerotized, evenly arcuate, costal margin membranous, basally moderately convex, then very slightly concave, apically rounded; harpe bifid with a short, thin, straight, pointed anterior and longer and thicker, apically upcurved, pointed, rather claw-like posterior process; sacculus short and narrow without processes; vinculum rather wide, relatively long, U-shaped, medially with a fine, short triangular protrusion. Aedeagus very short, rather broad, elongate quadrangular with ostium ductus ejaculatorii in its middle section; vesica armed with a single, very small, basally broadly rounded, apically finely pointed, thumbtack-like cornutus.

*Female genitalia* (Figs 13, 14). Ovipositor very short and broad, quadrangular, apophyses posteriores short, thin; 8th tergite very short, belt-like, apophyses anteriores moderately long, thin, apically pointed. Ostium bursae (antrum) relatively broad, cup-shaped, strongly sclerotized; ductus bursae rather long and medium broad, tubular, membranous, without protrusion; cervix bursae simple, membranous; tubular distal part of corpus bursae, gradually dilated proximally; proximal part of corpus bursae relatively small, elliptical-ovoid, with a pair of long, parallel arranged, medially dilated, ribbon-like and scobinate signum bursae.

**Distribution.**

The specimens of the type series were collected in three countries in Indochina: in the Central Highlands of Southern Vietnam, on the Lam Vien Plateau near Da Lat town, in Champasak province, near Pakse town in Laos and in Chiang Mai province near Doi Suthep in North Thailand. *Calonola theresiae* is supposedly distributed all over the mountainous parts of Indochina occurring sympatrically at places with the three other *Calonola* species.

**Etymology.**

The new species is dedicated to the senior author’s mother Terézia Bauer, who has always been supporting her son’s scientific ambitions and efforts in lepidopterology.
Acknowledgements

We would like to express our sincere thanks to the following colleagues provided extensive help during our studies: Dr Thomas J. Witt (†) (MWM/ZSM, Munich), Mr Martin Honey, Dr Alberto Zilli and Mr Geoff Martin (NHMUK, London), Dr Martin Lödl and Dr Sabine Gaal-Haszler (NHMW, Vienna).

This research received support from the SyntheSys Project http://www.synthesys.info/ which is financed by European Community Research Infrastructure Action under FP6 „Structuring the European Research Area” Programme, Grant Nos GB-TAF-2644 (G. Ronkay), GB-TAF-5432 (Gy.M. László).

References

Hampson, G.F. (1894) Fauna of British India Moths, including Burma & Ceylon. Volume 2, 145.
Hampson, G.F. (1907) Descriptions of new Genera and Species of Syntomidae, Arctiidae, Agaristidae, and Noctuidae. Annals and Magazine of Natural History 7(19), 229.
Lafontaine, J.D. & Mikkola, K. (1987) Lock-and-key system in the inner genitalia of Noctuidae (Lepidoptera) as taxonomic character. Entomologiske Meddelelser 55, 161–167.
László, Gy.M., Ronkay, G. & Witt, T.J. (2010) Contribution to the Nolinae (Lepidoptera, Noctuidae) fauna of North Thailand. Esperiana 15, 7–125.
László, Gy.M., Ronkay, G. & Ronkay, L. (2013) A new species of the genus Barnanola László, Ronkay & Witt, 2010 (Lepidoptera, Noctuoidea, Nolidae). Fibigeriana Supplement. Book series of Taxonomy and Faunistics 1, 177–180.
Walker, F. (1863) List of the specimens of Lepidopterous insects in the collection of the British Museum 27, 109.