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WHAT IS *LYCLENE DASARA* (MOORE, 1859) (LEPIDOPTERA, EREBIDAE, ARCTIINAE)?

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The paper contains data on the taxonomy of the '*Lyclene dasara* (Moore, [1860])' complex. *L. dasara* is known certainly from islands Java and Bali. The continental populations previously treated as '*L. dasara*' belong to two different species, *L. chromatica* (Swinhoe, 1891) **stat. nov.** known from South India and *L. undulata* (Swinhoe, 1903) **stat. & comb. nov.** known from Himalaya, China and Indochina (including the Malay Peninsula). All three species are very close externally, but differ in both male and female genitalia. The name *Lyclene corrigera* Volynkin & Bucsek, **nom. nov.** is introduced as replacement for *Lyclene undulata* Bucsek, 2012, nec. Swinhoe, 1903.

Key words: *Lepidoptera, Erebidae, Lithosiini, Lyclene, new status, new combination, replacement name, Asia.*

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INTRODUCTION

Lyclene Moore, [1860] is one of largest genera in the Lithosiini tribe (family Erebidae, subfamily Arctiinae). It includes more than 130 described species and widely distributed in Oriental and Palaearctic Regions. Long time species of the genus were treated as members of the genera *Asura* Walker, 1854 and *Miltochrista* Hübner, [1819]. Nielsen & al. (1996) used the name *Lyclene* for a number of Australian species, but Holloway (2001) gave a diagnosis of the genus, supported belonging of Australian species to the genus *Cyme* Felder, 1861 and not *Lyclene*, placed many former '*Miltochrista*' and '*Asura*' species to *Lyclene* and described many new species. Later, many new species of the genus were described and many new combinations were introduced by different authors (Černý & Pinratana, 2009; Kirti & Gill, 2009; Bucsek, 2012; 2014; Dubatolov & Bucsek, 2013; 2014; Wu *et al.* 2013; Černý, 2016; Volynkin, 2016).

Lyclene dasara (Moore, [1860]) was described from Java (Horsfield & Moore, [1860] 1859). Later, the taxa *Barsine chromatica* Swinhoe, 1891 was described from South India (Nilgiris) and *Asura undulata* Swinhoe, 1903 was described from East India ([Meghalaya] Khasia Hills). Both were synonymised with *dasara* by G.F. Hampson: *chromatica* in 1900, and *undulata* in 1914. Nevertheless, the last one was treated as a distinct species '*Asura undulata*' by Strand (1922) and Singh & al. (2014), and not mentioned in the *L. dasara* synonymy by authors (e.g., Fang, 2000; Černý & Pinratana, 2009; Bucsek, 2012).

During studies of Lithosiini materials deposited in the Natural History Museum (London), materials on '*Lyclene dasara*' including the types of *dasara*, *chromatica* and *undulata* were examined. Populations from South India (described as *chromatica*) have one cornutus in aedeagus vesica in the male genitalia, long and stongly sclerotized antevaginal plate and no triangular ventral lobe of corpus bursae in the female genitalia, and belongs clearly to a different species than all other populations having two cornuti in aedeagus vesica in male genitalia, and weakly sclerotized antevaginal plate and a triangular ventral lobe of corpus bursae in female genitalia. The other continental populations (described as *undulata*) are very close to those from Java and Bali (described as *dasara*), but differ in the cornuti shape in aedeagus vesica in male genitalia, and structure of female genitalia, so *undulata* and *dasara* should be treated as distinct species also, and not synonyms.

MATERIAL AND METHODS

The paper is based on the materials of the collection of the Natural History Museum, London (formerly British Museum of Natural History, NHM, London, Great Britain) and the private collections of Karol Bucsek (CKB, Bratislava, Slovak Republic) and Anton Volynkin (CAV, Barnaul, Russia). The genitalia were dissected and mounted in euparal on glass sides. Photos of imago where taken using the camera Nikon D3100/AF-S Nikkor, 18–55 mm. Photos of the genitalia where taken by same camera attached to a microscope with an LM-scope adapter, and further processed by Adobe Photoshop CS4® software.

RESULTS

Lyclene dasara (Moore, [1860])
(Figs 1–4, 19, 23)

Setina dasara Moore, [1860] 1859, *in* Horsfield & Moore, *A catalogue of the lepidopterous insects in the Museum of Natural History at the East-India House* **2**: 303 (Type localaity: "Java").

Type material examined: **Type** (Fig. 1), male, whitish handwritten label "Java (Horsfield)" / whitish printed round label with a red round "Type" / whitish handwritten label "*Dasara* Moore" / whitish printed label "60-15 E.I.C." / white printed label with QR-code "NHMUK010598169" (Coll. NHM).

Other material examined: 1 male, Java Oriental, Mont Ardjoëno, 1200–11500 m, W. Doherty, V.1891 (Coll. NHM); 1 male, Java Occid., Pengalangan, 4000', 1893, H. Fruhstorfer (Coll. NHM); 2 males, West Java (Coll. NHM); 1 male, Nongkodjadjar, E Java, 4000', VI.1934, J.P.A. Kallis (Coll. NHM); 6 males, 10 females, same locality, I–XII.1934, A.M.B. Wegner (Coll. NHM); 7 males, Batoeriti, E Bali, V.1936, J.P.A. Kallis (Coll. NHM); 1 female, same data, but VI.1935 (Coll. NHM); 1 female, same locality and collector, but 3500', VI.1935 (Coll. NHM); 16 males, Git-Git, E Bali, 5000', IV.1936, J.P.A. Kallis (Coll. NHM).

Diagnosis. In the all three species, *L. dasara*, *L. undulata* and *L. chromatica* the sexual dimorphism is well expressed: boths sexes have yellow ground color, but in males the forewing pattern consists of a basal black dot, a stroke-like dark brown discal spot and a dark brown, zigzag broad shade, whereas in females the forewing pattern is reduced. In *L. dasara*, the forewing pattern of females consists of a basal black dot and a dot-like black discal spot only (Figs 3, 4), and females of *L. dasara* have no significant external differences from those of *Lyclene calamaria* (Moore, 1888) (Figs 15, 16) belonging to another species-group. The correct determination of females of both species is possible by the study of the genitalia only (Figs 17, 18). The male genitalia of *L. dasara* (Fig. 19) are very close to those of *L. undulata* (Figs 20, 21), and differ by the symmetrical cornuti, whereas in *L. undulata* one cornutus is more robust than in *L. dasara*, and the second one is same as in *L. dasara* or noriceably narrower. The female genitalia of these two species have much more significant differences: in *L. dasara* (Fig. 23) the dorsal triangular lobe-like diverticulum of corpus bursae is very large, strongly sclerotized and situated medially, whereas in *L. undulata* (Fig. 24) it is much smaller, weakly sclerotized and situated much posteriorly; in addition, in *L. dasara* the two rows of spinules inside the corpus bursae are significantly longer and consist of larger spinules. Differences between *L. dasara* and *L. chromatica* are given in the diagnosis of the latter.

Distribution. Java, Bali (Horsfield & Moore, [1860] 1859; Hampson, 1900; 1914; Strand, 1922; Černý & Pinratana, 2009; Bucsek, 2012).

Note. The records for Sumatra (Hampson, 1900; van Eecke, 1926; Černý & Pinratana, 2009) can belong to both *L. dasara* and *L. undulata*. Unfortunately, we had no available material for examination, so the species belonging of Sumatran populations still needs revision.

Lyclene undulata (Swinhoe, 1903), **stat. & comb. nov.**
(Figs 5–10, 20, 21, 24)

Asura undulata Swinhoe, 1903; *The Annals and magazine of natural history (7)* **11**: 266 (Type localaity: [E India: Meghalaya] "Khasia Hills").

Type material examined: **Type** (Fig. 5), male, whitish printed label "Khasia Hills | Hamilton" / whitish handwritten label "*Asura undulata* Swinh. ♂ type" / whitish printed round label with a red round "Type" / printed whitish label "1903-177" / white printed label with QR-code "NHMUK010598171" (Coll. NHM).

Other material examined: [N India] Kangra (Hocking) (Coll. NHM); 5 males, 2 females, [E India] Khasia Hills, Assam, Nissary (Coll. NHM); 3 females, [E India] Khasis, VIII.1894, Native collector (Coll. NHM); 2 males, same data, but X.1894 (Coll. NHM); 1 male, 1 female, [E India] Khasis, Native collector (Coll. NHM); 1 male, 2 females, [E India] Assam, Shilong, H.M. Parish (Coll. NHM); 1 male, 2 females, [E India] Darjilling (F. Möller) (Coll. NHM); 1 female, [E India] Gopaldhara, Darjeeling, 4720', H. Stevens (Coll. NHM); 1 female, [E India] Darjeeling, 7500 ft., V–VI.1889, A.V. Knyvett (Coll. NHM); 1 female, [E India] Cherrapunji, VIII.1883, Assam (Coll. NHM); 1 female, [E India] Sikkim, F. Möller, 1888 (Coll. NHM); 3 males, 1 female,

1 male, [E India] Assam, 5000', Shillong, X.1924, Fletcher coll. (Coll. NHM); 3 females, [? E India/Myanmar] Naga Hills, 5000–8000 ft., VII–IX.1889, W. Doherty (Coll. NHM); 1 female, Bernardmyo, Burmah, 5500–7000', V.1890, W. Doherty (Coll. NHM); 1 male, [China] Omei-shan, 3500', Native collector., VI–VII.1890 (Coll. NHM); 3 males, [China] Siao Lou, Chasseurs indigènes, du P. Dejean, 1903 (Coll. NHM); 1 male, [China] Thibet, Ta-Ho, Chasseurs indigènes, Printenps 1895 (Coll. NHM); 1 male, [China] Ta-Tsien-Lu, 8300 ft., Pratt coll., VII–VIII.1890 (Coll. NHM); 1 male, 1 female, N. Thailand, Chiang Mai, Doi Inthanon NP, 1416 m, 18°30'59"N, 98°28'13"E, 7– 8.V.2008, leg. Karel Černý, ex ovo (Coll. CKB); 6 males, 3 females, X.2015, South Vietnam, Lam Dong province, Lac Duong district, Tay Nguyen Highlands, Nui Ba National Park, leg. Vo Van Nhon (Coll. CAV); 3 males, 7 females, [Malaysia] Pahang F.M.S., Cameron Highlands, Tanah Rata, 4500 ft., H.M. Pendlebury [leg.], 21.V.1931, 15.IX.1935, 5.XII.1939 (Coll. NHM); 1 male Malaysia West, Pahang distr., Tanah Rata env., 1550–1650 m, 1–29.III.2009, leg. Karol Bucsek (Coll. CKB); 1 female, Malaysia, Pahang distr., Cameron Highlands, Tanah Rata env., 1450–1500 m, 4°28'25,3"N, 101°22'43,7"E, 9–16.IV.2014, leg.Karol Bucsek (Coll. CKB).

Diagnosis. An externally variable species. In males, the shape of forewing shade can be either broad zigzag or a complex of broad and diffuse antemedial and postmedial lines (Figs 5–8); in females, the forewing pattern can be either consisting of curved antemedial and wavy postmedial lines (but both are significantly narrower than in males) or reduced to a basal black dot and a dot-like black discal spot like in *L. dasara* (Figs 9, 10). The correct determination of the latter form from females of *L. calamaria* is possible by the study of the genitalia structure only. The male genitalia of *L. undulata* (Figs 20, 21) are very close to those of *L. dasara* (Fig. 19), and differ by the cornuti shape only: in *L. dasara* the cornuti are symmetrical, whereas in *L. undulata* the cornuti are noticeably asymmetrical. Main differences between the two species can be found in the female genitalia: in *L. undulata* (Fig. 24) the dorsal triangular lobe-like diverticulum of corpus bursae is much smaller, weakly sclerotized and situated much posteriorly, whereas in *L. dasara* (Fig. 23) it is very large, strongly sclerotized and situated medially; in addition, in *L. dasara* the two rows of spinules inside the corpus bursae are significantly longer and consist of larger spinules. Differences between *L. undulata* and *L. chromatica* are given in the diagnosis of the latter.

Note. The forewing pattern of specimens from the Malay Peninsula is more close to that of *L. dasara* and not northern populations of *L. undulosa*, but the genitalia of both sexes have no differences from those of specimens from Himalaya and Vietnam.

Distribution. Himalaya (Nepal, northern and eastern India), China, Myanmar, Thailand, Laos, Vietnam, Malay Peninsula (all as *L. dasara*: Hampson 1914; Strand, 1922; de Joannis, 1928; Daniel, 1952; Kishida, 1993, 1994; Fang, 2000; Černý & Pinratana, 2009; Bucsek, 2012).

Lyclene chromatica (Swinhoe, 1891), **stat. nov.**
(Figs 11–14, 22, 25)

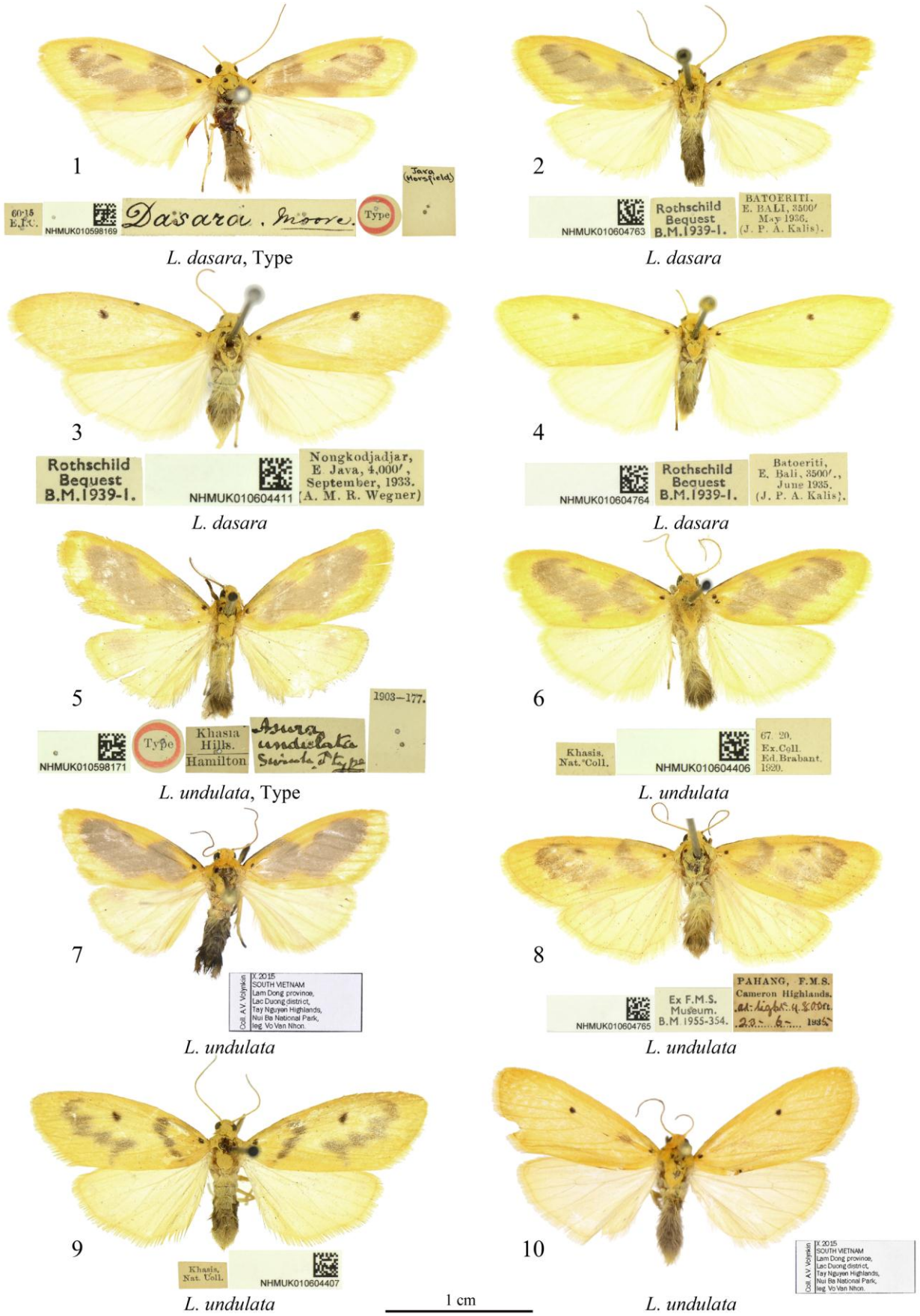
Barsine chromatica Swinhoe, 1891; *Transactions of the Entomological Society of London* **1891**: 135 (Type localaity: [S India] "Nilgiri Hills").

Type material examined: **Syntype** (Fig. 13), female without abdomen, whitish handwritten label "Nilgiris (Lindsay), 91-55" / whitish handwritten label "*Barsine chromatica* Swinhoe type" / whitish printed round label with a red round "Type" / white printed label with QR-code "NHMUK010598170" (Coll. NHM).

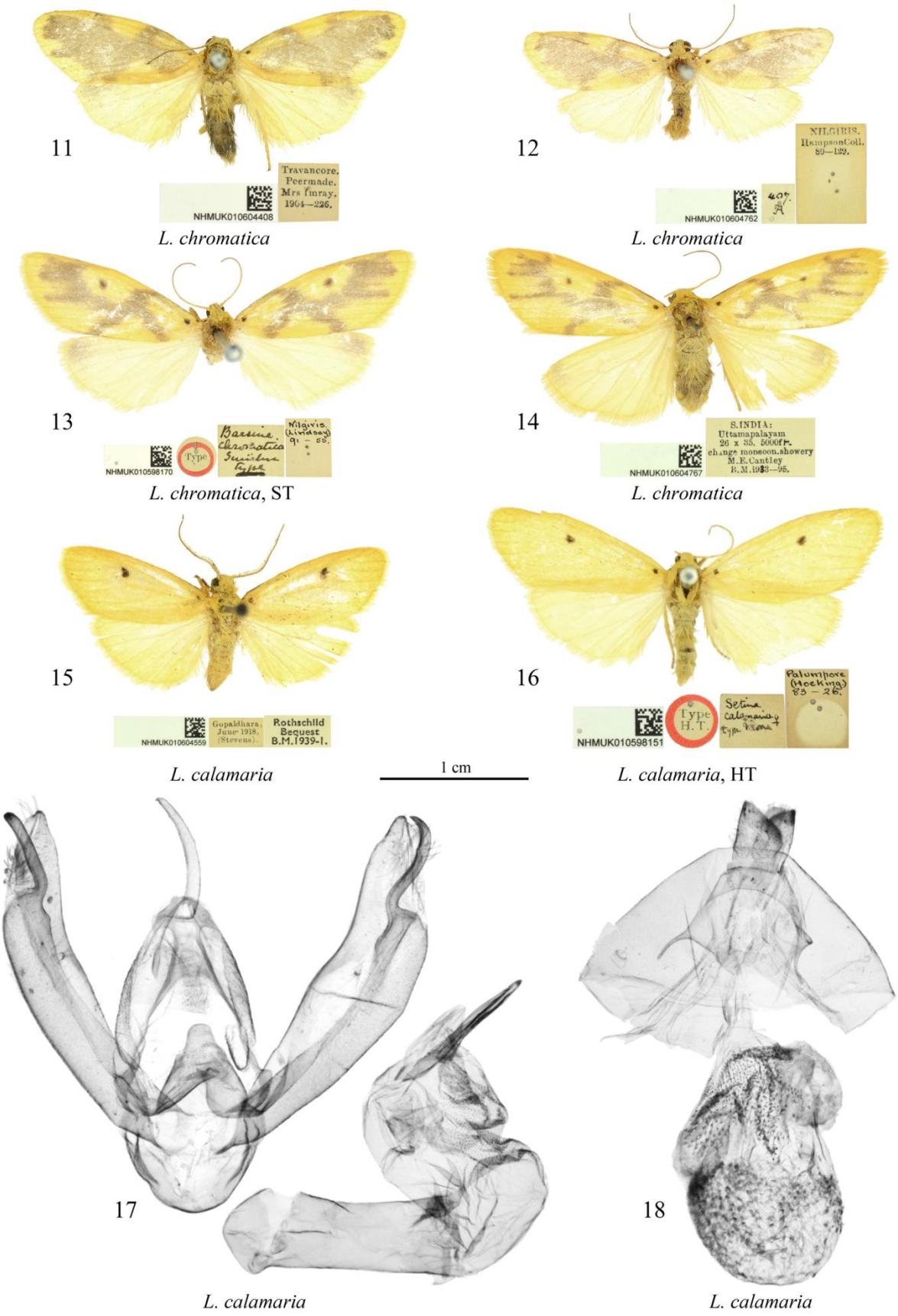
Other material examined: 1 male, 1 female, [S India] Travancore, Peermade, Mr. Ionray, 1904-25 (Coll. NHM); 1 male, [S India] Palmis, Kodai Kanal, IX.1921, Fletcher coll. (Coll. NHM); 1 female, S India, Uttamapalayam, 20.XI.[19]32, 5000 ft., NE monsoon showery, M.E. Cantley (Coll. NHM); 1 female, S India, Palmi Hills, 4000', Campbell, 1901 (Coll. NHM); 1 female, [S India] Nilgiris (Coll. NHM).

Diagnosis. In both sexes, the forewing pattern consists of strongly curved antemedial and postmedial lines which are X-like connected in the medial area, by this feature *L. chromatica* (Figs 11–14) can be distinguished easily from both *L. dasara* (Figs 1–4) and *L. undulata* (Figs 5–10). In the male genitalia, *L. chromatica* (Fig. 22) differs clearly from both other species (Figs 19–21) by the vesica structure: in *L. chromatica*, the number of small medial and subbasal diverticuli is smaller, only one apico-lateral diverticulum with a cornutus, and the second one without cornutus and is much broader, whereas in *L. dasara* and *L. undulata* there are numerous small medial and subbasal diverticuli, both apico-lateral diverticuli are narrow and with strong cornuti. In the male genitalia, *L. chromatica* (Fig. 25) differs from *L. dasara* (Fig. 23) and *L. undulata* (Fig. 24) by the broader and stronger sclerotized antevaginal plate, absence of a dorsal triangular lobe-like diverticulum of corpus bursae, and presence of a long transverse row of very short spinules in the anterior part of posterior section of corpus bursae.

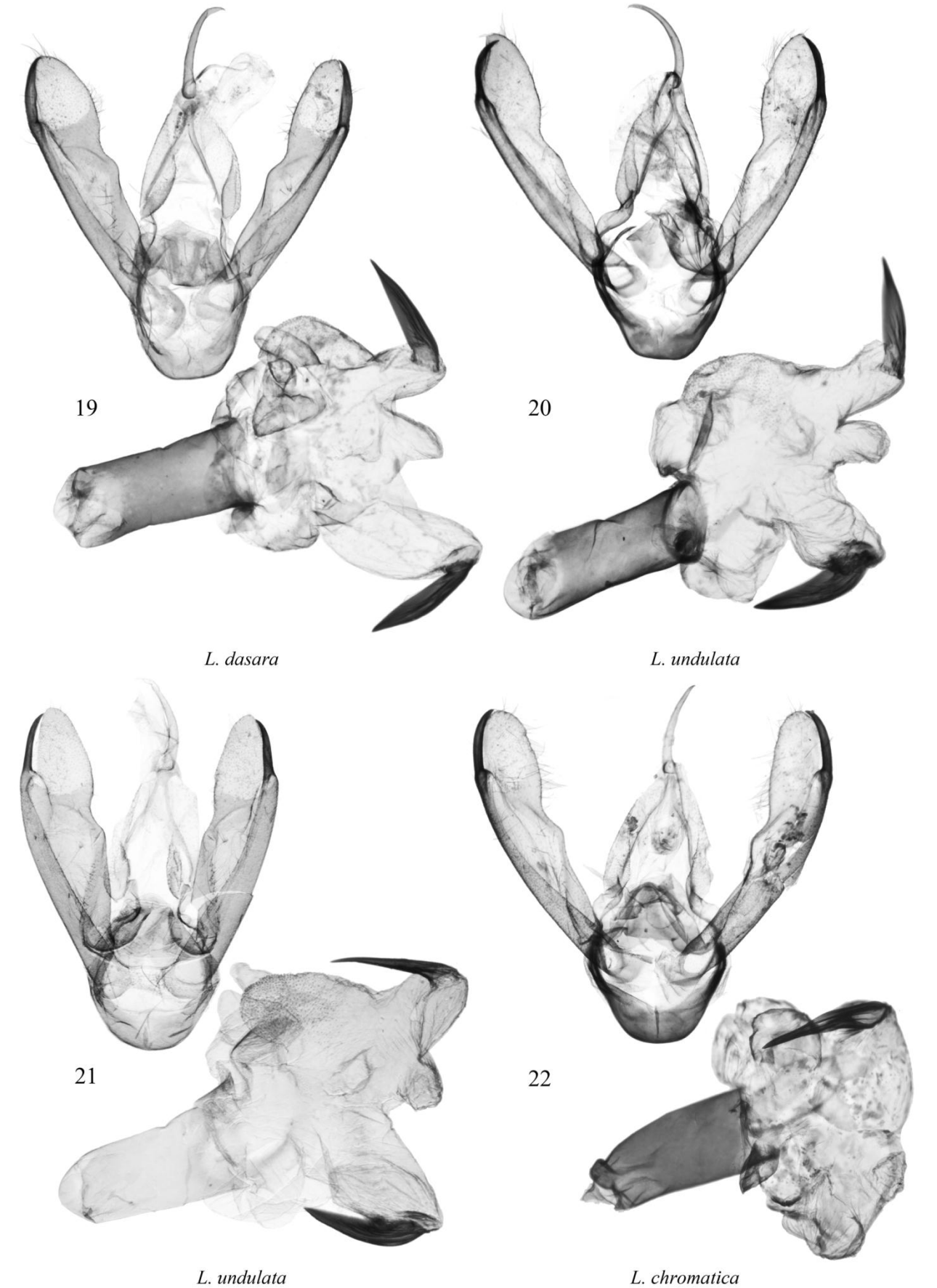
Distribution. South India (Swinhoe, 1891; Hampson, 1900).



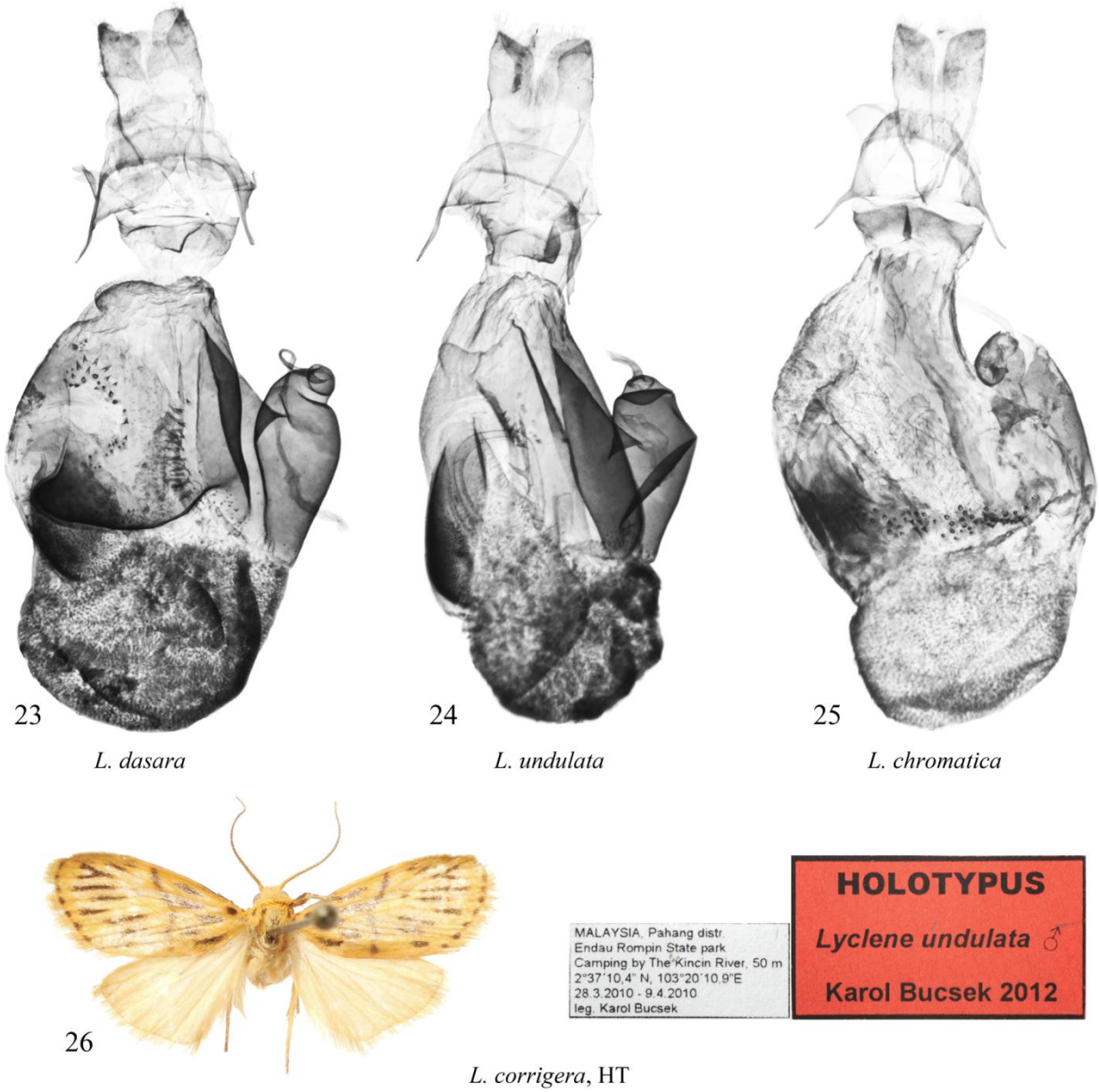
Figures 1–10. *Lyclene* spp., adults. 1 – *L. dasara*, type male, Java (©NHM); 2 – *L. dasara*, male, Bali (©NHM); 3 – *L. dasara*, female, Bali (©NHM); 4 – *L. dasara*, female, Bali (©NHM); 5 – *L. undulata*, type male, E India, Meghalaya (©NHM); 6 – *L. undulata*, male, E India, Meghalaya (©NHM); 7 – *L. undulata*, male, S Vietnam (CAV); 8 – *L. undulata*, male, Malaysia, Malay Peninsula (©NHM); 9 – *L. undulata*, female, E India, Meghalaya (©NHM); 10 – *L. undulata*, female, S Vietnam (CAV).



Figures 11–18. *Lyclene* spp., adults (11–16), male (17) and female (18) genitalia. 11 – *L. chromatica*, male, S India, Travancore (©NHM); 12 – *L. chromatica*, male, S India, Nilgiris (©NHM); 13 – *L. chromatica*, syntype female, S India, Nilgiris (©NHM); 14 – *L. chromatica*, male, S India, Uttamapalayam (©NHM); 15 – *L. calamaria*, male, E India, West Bengal (©NHM); 16 – *L. calamaria*, holotype female, N India, Himachal-Pradesh (©NHM); 17 – *L. calamaria*, E India, Assam, slide BMNH(E) Arct-5352m Holloway (©NHM); 18 – *L. calamaria*, Borneo, slide BMNH(E) Arct-5354m Holloway (©NHM).



Figures 19–22. *Lyclene* spp., male genitalia. 19 – *L. dasara*, Java, slide BMNH(E) Arct-6516m Volynkin (©NHM); 20 – *L. undulata*, E India, Meghalaya, Khasi Hills, slide BMNH(E) Arct-6521m Volynkin (©NHM); 21 – *L. undulata*, S Vietnam, slide AV1598m Volynkin (CAV); 22 – *L. chromatica*, S India, Travancore, slide BMNH(E) Arct-6523m Volynkin (©NHM).



Figures 23–26. *Lyclene* spp., female genitalia (23–25) and adult (26). 23 – *L. dasara*, Java, slide BMNH(E) Arct-6525f Volynkin (©NHM); 24 – *L. undulata*, E India, Meghalaya, Khasi Hills, slide BMNH(E) Arct-6522f Volynkin (©NHM); 25 – *L. chromatica*, S India, Travancore, slide BMNH(E) Arct-6524f Volynkin (©NHM); 26 – *L. corrigera* **nom. nov.**, holotype male, Malaysia (MWM).

APPENDIX

Lyclene undulata Bucsek, 2012 was described from the Malay Penninsula (Bucsek, 2012). Because of the new combination *Lyclene undulata* (Swinhoe, 1903) **comb. nov.**, *L. undulata* Bucsek is a minor secondary homonym of *L. undulata* (Swinhoe). *L. undulata* Bucsek has no synonyms and according to the article 60 of ICZN (1999), this name should be replaced on another one for this species. Therefore here we introduce the name *Lyclene corrigera* Volynkin & Bucsek, **nom. nov.** as replacement for *Lyclene undulata* Bucsek.

Lyclene corrigera Volynkin & Bucsek, **nom. nov.**

(Fig. 26)

= *Lyclene undulata* Bucsek, 2012, Erebidae, Arctiinae of Malay Peninsula – Malaysia: 59, pl. 11: 141a–141d, gen. fig. Mal076 (Type localaity: "Malaysia, Pahang distr., Endau Rompin State Park, Camping by the Kincin River, 50 m"), nec. Swinhoe, 1903.

Note. The holotype of the species (Fig. 26) is deposited in the Museum Witt Munich (MWM, Munich, Germany) as a holotype of *Lyclene undulata* Bucsek, 2012.

Distribution. Malay Peninsula (Bucsek, 2012).

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