

# *Thibetana keili* Efetov & Tarmann, a new species of the genus *Thibetana* Efetov & Tarmann, 1995, from Tibet (Lepidoptera: Zygaenidae, Procridinae, Artonini)

K. A. Efetov & G. M. Tarmann

## Abstract

A new species, *Thibetana keili* Efetov & Tarmann, sp. n., is described from Tibet (China). The characters of this species are compared with those of *Artona postalba* Elwes, 1890 (from Sikkim, India). The latter species is transferred here from *Artona* Walker, 1854, to *Thibetana* Efetov & Tarmann, 1995: *Thibetana postalba* (Elwes, 1890), comb. n. Moreover, also *Artona zebra* Elwes, 1890 (from Sikkim, India) is here transferred from *Artona* to *Thibetana*: *Thibetana zebra* (Elwes, 1890), comb. n.

KEY WORDS: Lepidoptera, Zygaenidae, Procridinae, Artonini, *Artona*, *Thibetana*, *Th. keili*, new species, *Th. postalba*, *Th. zebra*, new combination, Tibet, China, Sikkim, India.

*Thibetana keili* Efetov & Tarmann, una nueva especie del género *Thibetana* Efetov & Tarmann, 1995,  
del Tibet  
(Lepidoptera: Zygaenidae, Procridinae, Artonini)

## Resumen

Se describe una nueva especie, *Thibetana keili* Efetov & Tarmann, sp. n., del Tibet (China). Se comparan los caracteres de esta nueva especie con los de *Artona postalba* Elwes, 1890 (de Sikkim, India). La última especie es transferida de *Artona* Walker, 1854, a *Thibetana* Efetov & Tarmann, 1995: *Thibetana postalba* (Elwes, 1890), comb. n. Moreover, también *Artona zebra* Elwes, 1890 (de Sikkim, India) es aquí transferido desde *Artona* a *Thibetana*: *Thibetana zebra* (Elwes, 1890), comb. n.

PALABRAS CLAVE: Lepidoptera, Zygaenidae, Procridinae, Artonini, *Artona*, *Thibetana*, *Th. keili*, nueva especie, *Th. postalba*, *Th. zebra*, nueva combinación, Tibet, China, Sikkim, India.

## Introduction

The genus *Thibetana* Efetov & Tarmann, 1995, was described to accommodate the two isolated high mountain species *Artona sieversi* Alphéraky, 1892 (type species) and *Artona delavayi* Oberthür, 1894 (both from China). In 1997 Efetov described *Thibetana witti* Efetov, 1997, from eastern Tibet, a third species in this genus (EFETOV, 1997c). While investigating material of Procridinae in the collection of Mr Thomas Keil (Dresden, Germany) one male specimen of a new species of this genus was found. Its description is provided below.

The new species is compared with the holotype of the externally similar *Artona postalba* Elwes, 1890, from Sikkim (India). As the characters of the latter correspond with those of *Thibetana* Efetov &

Tarmann, 1995, and not with those of *Artona* Walker, 1854, it is here transferred to the genus *Thibetana* with the new combination *Thibetana postalba* (Elwes, 1890), **comb. n.**

*Thibetana keili* Efetov & Tarmann, sp. n. (Figs. 1, 2, 7)

Material: Holotype ♂, with printed pin-label: "China - Tibet SE / Mt. Namehawazwa / SE - Hang 4.400 m / Juni 1998" (Coll. Thomas Keil, Dresden, Germany). The holotype has been supplied with printed pin-label on red paper: "HOLOTYPUS / male / *Thibetana keili* / Efetov & / Tarmann, 2017". [In citing the pin-label data, the symbol "/" denotes the end of a line.]

Description: Length of body: 4.7 mm; length of forewing: 7.0 mm; breadth: 3.2 mm; length of hindwing: 5.7 mm; breadth: 3.4 mm. Tips of antennae broken. Frons rounded, dark brown, with yellow scales at medial part, twice the breadth of compound eye in frontal view, occiput covered with blackish brown scales, compound eyes small, black, not ringed with yellow (like in *Th. witti*), ocelli small, unscaled space between compound eye and ocellus ca 3 times the diameter of ocellus, chaetosemata oval, slightly protruding between ocellus and compound eye. Labial palps short, slightly curved upwards, blackish brown. Antenna covered with dark brown scales, bipectinate, pectination long (length of pectination in middle part of antenna 0.7 mm). Proboscis dark brown, well developed. Tegulae yellow, patagia with blackish brown medial and yellow lateral part. Thorax thickly covered with blackish brown scales (dorsally and ventrally). Wings densely scaled, upperside of forewings dark brown, with yellow spots (Fig. 1). The terminology of the forewing spots follows EFETOV (1997c): spot 1 absent, 2-4 oval, 5+6 connected to form an hourglass-shaped spot. Fringe of forewing yellow, dark brown only at apex. Underside of forewing light brown, spots as in upperside but whitish yellow. Hindwing on upperside and underside greyish brown, with a greyish white central part, that has a characteristic hook-shaped whitish appendix at anterior margin. Fringe of hindwing greyish white, brown at apex. Forewing with veins r2 + r3 stalked (as figured for *Th. sieversi* in ALBERTI, 1954: 463, pl. 53, fig. 13). Medial stem present in both wings. Hindwing with only one medial vein situated slightly posterad of medial stem. Legs thickly covered with dark brown scales, the lateral part of the femur of foreleg yellow; foreleg with long tibial epiphysis, mid tibia with two spurs (apical), hind tibia with three spurs (one medial and two apical). Abdomen thickly covered with scales, dark brown, segments 1 and 5-8 with white distal parts dorsally, ventral part of abdomen uniformly dark brown with whitish scales on the distal part of segment 8.

Male genitalia: Uncus sclerotised, as long as tegumen. Valva triangular, strongly sclerotised dorsally and ventrally, with translucent central part; ventral part of valva with additional, roundish, sclerotised lobe; proximal ends of the dorsal parts of valvae asymmetrical (this could be an aberration), covered with setae. Juxta of characteristic shape, oval, with two symmetrical processes at posterior (distal) part bearing short dentations on their apices and lateral margins. Saccus strongly developed, broad and long, approximately as long as uncus. Aedeagus straight, twice the length of uncus, narrow (ratio of length to breadth in lateral view nearly 10), without cornuti.

Differential diagnosis: *Thibetana keili* sp. n. is close to *Th. postalba* (Elwes, 1890), but differs in wing pattern (Figs. 1, 3) and genitalia structure (Figs. 7, 8). In *Th. keili* spot 4 is oval, in *Th. postalba* it is round, in *Th. keili* spot 5 has nearly the same breadth as spot 6, in *Th. postalba* it is two times narrower than spot 6. The central part of the hindwing in *Th. keili* is greyish white with diffuse margin, in *Th. postalba* it is white with sharp margin. The fringe of the hindwing in *Th. keili* is greyish white, brown at apex, but dark grey in *Th. postalba*. The genitalia processes of the juxta in *Th. keili* have dentations shorter than in *Th. postalba*. In *Th. keili* the uncus is as long as the tegumen, while in *Th. postalba* it is significantly shorter than tegumen. The saccus in *Th. keili* has the same length as the uncus, in *Th. postalba* it is much longer (two times longer than the uncus). The aedeagus in *Th. keili* is straight, in *Th. postalba* it is bent downwards in the central part.

Derivatio nominis: The new species is named in honour of our friend Thomas Keil who has worked for many years with Asian Zygaenidae, especially studying their biology and distribution.

Bionomics: High mountain species. On the wing in June. Larval host-plant(s) unknown.

Relationship: According to contemporary systematics, the subfamily Procridinae is divided into the two tribes: Artonini Tarmann, 1994 (EFETOV, 1997a; EFETOV & TARMANN, 1995, 2012; TARMANN, 1994, 2004) and Procridini Boisduval, 1828 (EFETOV, 2001b; EFETOV & TARMANN, 1995, 2012; TARMANN, 1994). The tribe Artonini includes species from the eastern Palaearctis, the Oriental, Australian and Afrotropical regions (EFETOV, 1997a; EFETOV & TARMANN, 1996, 1999; TARMANN, 2004), while Procridini are distributed in the Palaearctic, Nearctic, Neotropical, Afrotropical regions and the northern parts of the Oriental region (EFETOV, 1996, 1997b, 1998; 2001a, 2006, 2010; EFETOV *et al.*, 2004, 2010, 2011, 2014, 2016; EFETOV & TARMANN, 2008, 2013a, b, 2014, 2016, 2017; KNYAZEV *et al.*, 2015; MUTANEN *et al.*, 2016; SUBCHEV *et al.*, 2010, 2012, 2013).

The tribe Artonini is characterised by the dorsoventrally compressed head with flat occiput (TARMANN, 2004), the shape of the chaetosema that extends forward between the compound eye and the ocellus (TARMANN, 1994, 2004), a single unpaired medial spur on hind tibia (EFETOV, 2005a, b; 2006; EFETOV & TARMANN, 1996, 2008), the fan-shaped valva in the male genitalia (TARMANN, 1994, 2004) and the chaetotaxy of the first instar larva (with only one dorsal seta on the first abdominal segment) (EFETOV *et al.*, 2006; EFETOV & HAYASHI, 2008; TARMANN, 2004).

The species of the genus *Thibetana* Efetov & Tarmann, 1995, have a dorsoventrally compressed head capsule, a chaetosema that is slightly extended forward between ocellus and compound eye, a single medial spur on hind tibia and a fan-shaped valva. These characters are present in all six known species, and allow us to conclude that *Thibetana* belongs to the tribe Artonini (EFETOV & TARMANN, 1995; EFETOV, 1997c; this publication).

The genus *Thibetana* is related to *Artona* Walker, 1854 (both Artonini), but somehow isolated with only a few species that inhabit exclusively high mountain regions in the eastern Himalayas and adjacent territories of China. Both genera share the characteristic black and yellow pattern on the forewing upperside. The main difference between *Thibetana* and *Artona* is the lack of the finger-like process at the apex of the valva ("*Artona*"-finger sensu EFETOV & TARMANN, 1995) in the male genitalia of *Thibetana*. At the moment, we know six species that belong to this genus: *Thibetana sieversi* (Alphéraky, 1892) (China), *Thibetana delavayi* (Oberthür, 1894) (China), *Thibetana witti* Efetov, 1997 (eastern Tibet, China), *Thibetana zebra* (Elwes, 1890) (Sikkim, India), **comb. n.** (here transferred from *Artona* to *Thibetana*) (Figs. 5, 6), *Thibetana postalba* (Elwes, 1890) (Sikkim, India), **comb. n.** (here transferred from *Artona* to *Thibetana*) (Figs. 3, 4), and *Thibetana keili* Efetov & Tarmann, **sp. n.** (eastern Tibet, China) (Figs. 1, 2). The new combinations are based on the study of the holotypes deposited in The British Museum (Natural History).

## Acknowledgements

We thank Mr P. V. Ruchko (Crimea, Russia) for help in preparing the genitalia drawing and Dr Alberto Zilli (London, U.K.) for providing genitalia photos. We are also indebted to Dr Adrian Spalding for editing the English text.

## BIBLIOGRAPHY

- ALBERTI, B., 1954.– Über die stammesgeschichtliche Gliederung der Zygaenidae nebst Revision einiger Gruppen (Insecta, Lepidoptera).– *Mitteilungen aus dem Zoologischen Museum der Humboldt-Universität Berlin*, **30**: 115-480.
- ALPHÉRAKY, S. 1892.– Lépidoptères rapportés de la Chine et de la Mongolie par G. N. Potanine.– *In* Romanoff, N. M., *Mémoires sur les Lépidoptères*, **6**: 1-81, pl. 1, figs 3, 4. St.-Pétersbourg.
- EFETOV, K. A., 1996.– The description of the female of *Illiberis (Alterasvenia) yuemanensis* Alberti, 1951 (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **47**: 111-113.
- EFETOV, K. A., 1997a.– Two new species of the genus *Artona* Walker, 1854 (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **48**: 165-177.

- EFETOV, K. A., 1997b.– Three new species of the genus *Illiberis* Walker, 1854, from Taiwan and Vietnam (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **48**: 231-244.
- EFETOV, K. A., 1997c.– *Thibetana witti* sp. nov. from Tibet (Lepidoptera, Zygaenidae, Procridinae).– *Entomofauna*, **18**: 509-512.
- EFETOV, K. A., 1998.– A revision of the genus *Goe* Hampson, [1893] (Lepidoptera: Zygaenidae, Procridinae), with descriptions of two new species.– *Entomologist's Gazette*, **49**: 49-62.
- EFETOV, K. A., 2001a.– On the systematic position of *Zygaenoprocris* Hampson, 1900 (Lepidoptera: Zygaenidae, Procridinae) and the erection of two new subgenera.– *Entomologist's Gazette*, **52**: 41-48.
- EFETOV, K. A., 2001b.– An annotated check-list of Forester moths (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **52**: 153-162.
- EFETOV, K. A., 2005a.– *The Zygaenidae (Lepidoptera) of the Crimea and other regions of Eurasia*: 420 pp. CSMU Press, Simferopol.
- EFETOV, K. A., 2005b.– Zygaenidae: pp. 146-162, 93 figs.– In P. A. LER (Ed.). *Key to the Insects of Russian Far East. Trichoptera and Lepidoptera*, **5**(5): 576 pp. Dalnauka, Vladivostok.
- EFETOV, K. A., 2006.– Nine new species of the genus *Chrysartona* Swinhoe, 1892 (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette* **57**: 23-50.
- EFETOV, K. A., 2010.– *Illiberis (Hedina) louisi* sp. nov. (Lepidoptera: Zygaenidae, Procridinae) from China.– *Entomologist's Gazette*, **61**: 235-241.
- EFETOV, K. A., CAN, F., TOSHOVA, T. B. & SUBCHEV, M., 2010.– New sex attractant for *Jordanita anatolica* (Naufock) (Lepidoptera: Zygaenidae: Procridinae).– *Acta Zoologica Bulgarica*, **62**(2): 315-319.
- EFETOV, K. A. & HAYASHI, E., 2008.– On the chaetotaxy of the first instar larva of *Artona martini* Efetov, 1997 (Lepidoptera: Zygaenidae, Procridinae, Artonini).– *Entomologist's Gazette*, **59**: 101-104.
- EFETOV, K. A., KUCHERENKO, E. E., PARSHKOVA, E. V. & TARMANN, G. M., 2016.– 2-butyl 2-dodecenoate, a new sex attractant for *Jordanita (Tremewania) notata* (Zeller, 1847) and some other Procridinae species (Lepidoptera: Zygaenidae).– *SHILAP Revista de lepidopterologia*, **44**: 519-527.
- EFETOV, K. A., PARSHKOVA, E. V., BAEVSKY, M. Y. & PODDUBOV, A. I., 2014.– Sec-butyl ester of dodecenoate: synthesis and attractive properties.– *The Ukrainian Biochemical Journal*, **86**(6): 175-182. (In Russian with English summary).
- EFETOV, K. A., PARSHKOVA, E. V. & KOSHIO, C., 2004.– The karyotype of *Illiberis (Primilliberis) rotundata* Jordan, [1907] (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **55**: 167-170.
- EFETOV, K. A., SUBCHEV, M. A., TOSHOVA, T. B. & KISELEV, V. M., 2011.– Attraction of *Zygaenoprocris taftana* (Alberti, 1939) and *Jordanita horni* (Alberti, 1937) (Lepidoptera: Zygaenidae, Procridinae) by synthetic sex pheromones in Armenia.– *Entomologist's Gazette*, **62**: 113-121.
- EFETOV, K. A. & TARMANN, G. M., 1995.– An annotated check-list of the Palaearctic Procridinae (Lepidoptera: Zygaenidae), with descriptions of new taxa.– *Entomologist's Gazette*, **46**: 63-103.
- EFETOV, K. A. & TARMANN, G. M., 1996.– On the systematic position of *Inope* Staudinger, 1887 (Lepidoptera: Zygaenidae, Procridinae).– *Nachrichten des entomologischen Vereins Apollo*, N. F., **17**: 201-208.
- EFETOV, K. A. & TARMANN, G. M., 1999.– On the systematic position of *Procris fusca* Leech, [1889] (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **50**: 163-168.
- EFETOV, K. A. & TARMANN, G. M., 2008.– *Chrysartona Swinhoe, 1892 (Lepidoptera: Zygaenidae, Procridinae)*: 116 pp. CSMU Press, Simferopol.
- EFETOV, K. A. & TARMANN, G. M., 2012.– *A checklist of the Palaearctic Procridinae (Lepidoptera: Zygaenidae)*: 108 pp. CSMU Press, Simferopol - Innsbruck.
- EFETOV, K. A. & TARMANN, G. M., 2013a.– *Illiberis (Alterasvenia) cernyi* sp. nov. (Lepidoptera: Zygaenidae, Procridinae) from northern Thailand.– *Entomologist's Gazette*, **64**: 33-39.
- EFETOV, K. A. & TARMANN, G. M., 2013b.– *Chrysartona (Chrystarmanna) mineti* sp. nov. (Lepidoptera: Zygaenidae, Procridinae) from northern Vietnam.– *Entomologist's Gazette*, **64**: 197-206.
- EFETOV, K. A. & TARMANN, G. M., 2014.– *Illiberis (Alterasvenia) banmauka* sp. nov. (Lepidoptera: Zygaenidae, Procridinae) from China and Myanmar.– *Entomologist's Gazette*, **65**: 62-70.
- EFETOV, K. A. & TARMANN, G. M., 2016.– *Pseudophacusa multidentata* Efetov & Tarmann, a new genus and species of Procridini from Myanmar, China and Laos (Lepidoptera: Zygaenidae, Procridinae).– *SHILAP Revista de lepidopterologia*, **44**: 81-89.
- EFETOV, K. A. & TARMANN, G. M., 2017.– The hypothetical ground plan of the Zygaenidae, with a review of the possible autapomorphies of the Procridinae and the description of the Inouelinae subfam. nov.– *Journal of the Lepidopterists' Society*, **71**: 20-49.

- EFETOV, K. A., TARMANN, G. M., HAYASHI, E. & PARSHKOVA, E. V., 2006.– New data on the chaetotaxy of the first instar larvae of Procradini and Artonini (Lepidoptera: Zygaenidae, Procridinae).– *Entomologist's Gazette*, **57**: 229-233.
- ELWES, H. J., 1890.– On some new moths from India.– *Proceedings of the Zoological Society of London*, **1890**: 378-401.
- KNYAZEV, S. A., EFETOV, K. A. & PONOMARYOV, K. B., 2015.– Zygaenidae (Lepidoptera) from Omsk Region.– *Zoologicheskii Zhurnal*, **94**(11): 1297-1302.
- MUTANEN, M., KIVELA, S. M., VOS, R. A., DOORENWEERD, C., RATNASINGHAM, S., HAUSMANN, A., HUEMER, P., DINCA, V., van NIEUKERKEN, E. J., LÓPEZ-VAAMONDE, C., VILA, R., AARVIK, L., DECAENS, Th., EFETOV, K. A., HEBERT, P. D. N., JOHNSEN, A., KARSHOLT, O., PENTINSAARI, M., ROUGERIE, R., SEGERER, A., TARMANN, G., ZAHIRI, R. & GODFRAY, H. C. J. 2016.– Species-level para- and polyphyly in DNA barcode gene trees: strong operational bias in European Lepidoptera.– *Systematic Biology*, **65**: 1024–1040.
- OBERTHÜR, Ch., 1894.– Faunes entomologiques - Descriptions d'Insectes nouveaux ou peu connus. Chalcosiidae, Zygaenidae.– *Études d'Entomologie*, **19**: 25-32, pls 5, 6. Rennes.
- SUBCHEV, M., EFETOV, K. A., TOSHOVA, T., PARSHKOVA, E. V., TOTTH, M. & FRANCKE, W., 2010.– New sex attractants for species of the zygaenid subfamily Procridinae (Lepidoptera: Zygaenidae).– *Entomologia Generalis*, **32**(4): 243-250.
- SUBCHEV, M. A., KOSHIO, C., TOSHOVA, T. B. & EFETOV, K. A., 2012.– *Illiberis (Primilliberis) rotundata* Jordan (Lepidoptera: Zygaenidae: Procridinae) male sex attractant: Optimization and use for seasonal monitoring.– *Entomological Science*, **15**: 137-139.
- SUBCHEV, M., KOSHIO, C., TOSHOVA, T., EFETOV, K. A. & FRANCKE, W., 2013.– (2R)-butyl (7Z)-dodecenoate, a main sex pheromone component of *Illiberis (Primilliberis) pruni* Dyar (Lepidoptera: Zygaenidae: Procridinae)?.– *Acta Zoologica Bulgarica*, **65**(3): 391-396.
- TARMANN, G. M., 1994.– A preliminary review of the classification of the zygaenid subfamily Procridinae (Lepidoptera).– *Nota lepidopterologica*, Supplement **5**: 115-123.
- TARMANN, G. M., 2004.– *Zygaenid Moths of Australia. A revision of the Australian Zygaenidae (Procridinae: Artonini)*.– In M. HORAK (Ed.), *Monographs on Australian Lepidoptera*, **9**: 248 pp. CSIRO Publishing, Collingwood.
- WALKER, F., 1854.– Lepidoptera Heterocera (Pars 1, 2). *List of the Specimens of lepidopterous Insects in the Collection of the British Museum*, **1**: 1-278; **2**: 279-581. London.

\*K. A. E.  
Department of Biochemistry  
and Laboratory of Biotechnology  
Crimean Federal University  
RUS-295051 Simferopol (Crimea)  
RUSIA / RUSSIA  
E-mail: efetov.konst@gmail.com  
<https://orcid.org/0000-0003-1468-7264>

G. M. T.  
Tiroler Landesmuseen-Betriebsgesellschaft m.b.H.  
Sammlungs- und Forschungszentrum  
Krajnc-Strasse, 1  
A-6060 Hall  
AUSTRIA / AUSTRIA  
E-mail: g.tarmann@tiroler-landesmuseen.at  
<https://orcid.org/0000-0002-7360-5698>

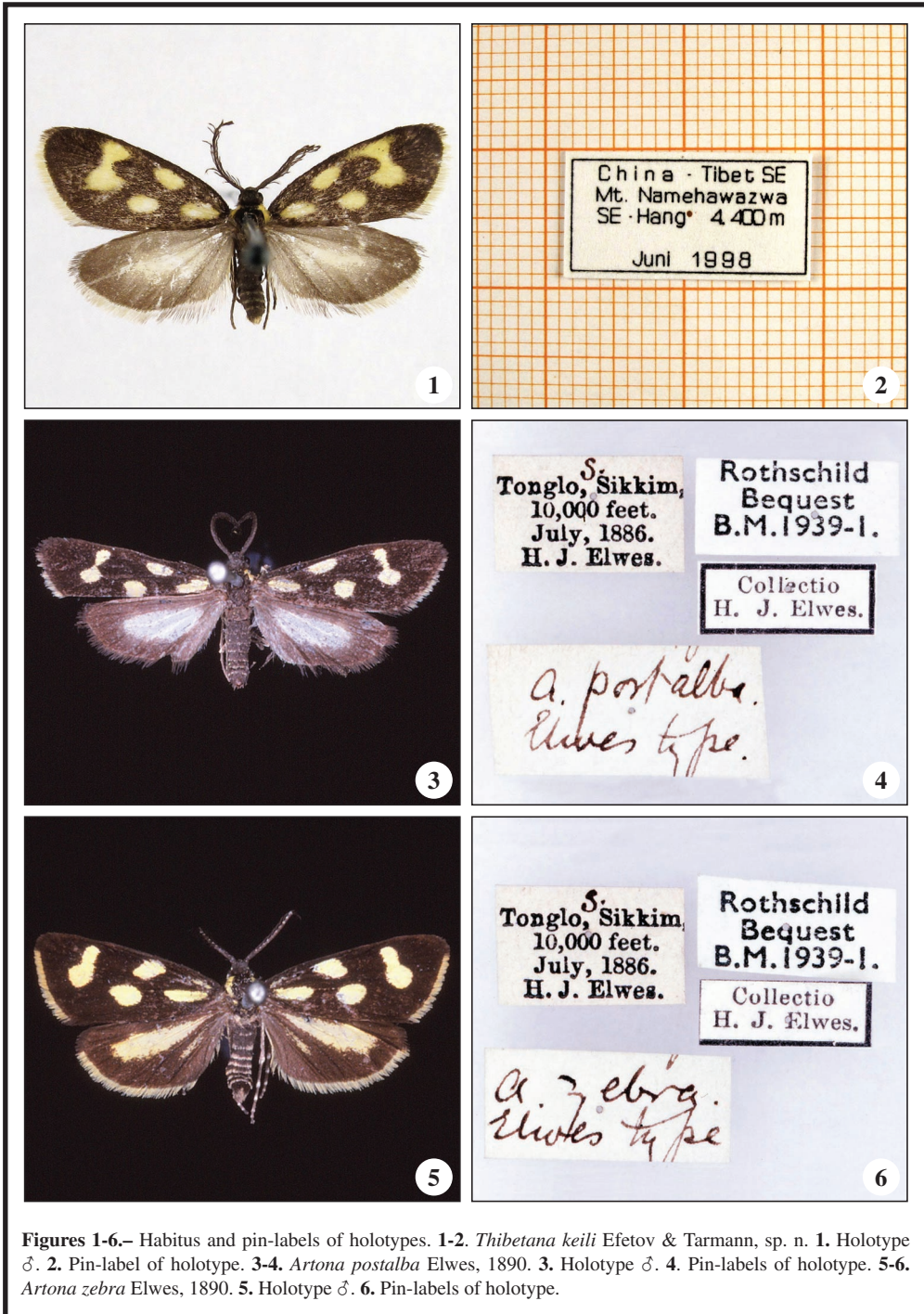
\*Autor para la correspondencia / *Corresponding author*

(Recibido para publicación / *Received for publication* 14-II-2017)

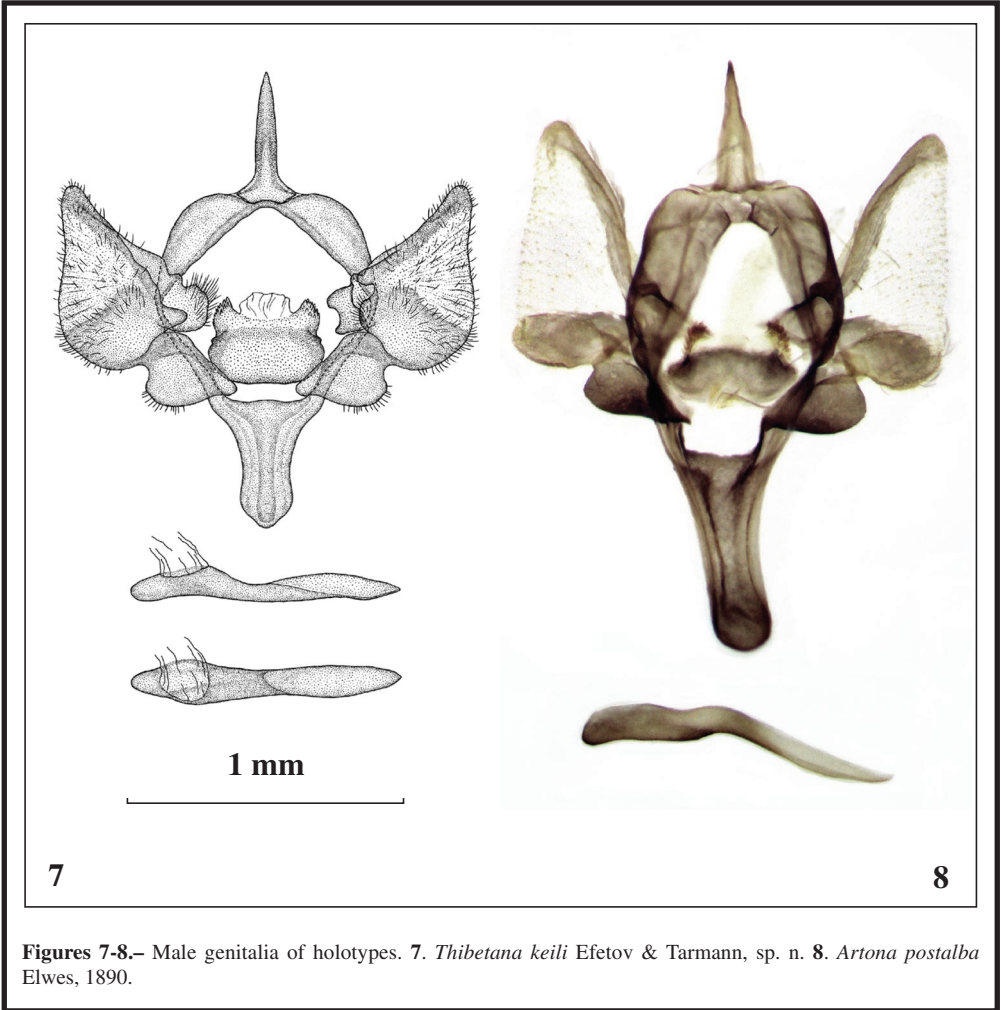
(Revisado y aceptado / *Revised and accepted* 20-IV-2017)

(Publicado / *Published* 30-XII-2017)





Figures 1-6.— Habitus and pin-labels of holotypes. 1-2. *Thibetana keili* Efetov & Tarmann, sp. n. 1. Holotype ♂. 2. Pin-label of holotype. 3-4. *Artona postalba* Elwes, 1890. 3. Holotype ♂. 4. Pin-labels of holotype. 5-6. *Artona zebra* Elwes, 1890. 5. Holotype ♂. 6. Pin-labels of holotype.



Figures 7-8.— Male genitalia of holotypes. 7. *Thibetana keili* Efetov & Tarmann, sp. n. 8. *Artona postalba* Elwes, 1890.