

A new Hyblaeidae species from Taiwan

(Lepidoptera: Hyblaeoidea)

Contributions to the moths of Taiwan 22*

Studies of Hyblaeidae 8**

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The new species *Hyblaea puli* sp. nov. is described from Central Taiwan. The species is compared with similar species of the *H. constellata* species group. There are clear differences in the wing markings on both the upper and underside, as well as in the genital structures.

In der vorliegenden Arbeit wird die neue Art *Hyblaea puli* sp. nov. aus Zentral-Taiwan beschrieben. Die Art wird mit ähnlichen Arten der *H. constellata*-Artengruppe verglichen. Es bestehen deutliche Unterschiede in der Flügelzeichnung sowohl der Ober- wie auch der Unterseite als auch in den Genitalstrukturen.

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Introduction

During the study of the Hyblaeidae from Taiwan some more undescribed specimens could be found, one is described here as new to science.

The entomology research in Taiwan started in 2001 with a DAAD Project and with further excursions in cooperation with the Meifeng Experimental Farm (National Taiwan University) and the Da-Yeh University in Changhua. After nearly 25 years of research in Taiwan, numerous articles were published in the past, and with this

new one we want to continue with this series of papers published in the last years (e.g. Buchsbaum & Miller 2002, Buchsbaum et al. 2006, Chen 2009, Chen et al. 2013, Buchsbaum et al. 2018, Chen et al. 2018, Buchsbaum & Grehan 2019).

The collecting sites were located nearly all over Taiwan, from sea level to the highest points at more than 3000 m a.s.l. and in many different biotopes and habitats. The species here new described was collected in the centre of Taiwan around the city of Puli.

* Contributions to the moths of Taiwan 21: Grehan, J. R., Buchsbaum, U., Chen, M.-Y. & Jones, L. 2023. New species of *Bipectilus* Chu & Wang (Lepidoptera: Hepialidae) ghost moth from Meifeng, Taiwan and first record of the genus outside mainland Asia. Vernate, Erfurt 42: 213–224.

** Studies of Hyblaeidae 7: Buchsbaum, U. & Chen, M.-Y. 2024. *Hyblaea chitwana* sp. n., a new Hyblaeidae from Chitwan National Park, Nepal (Insecta: Lepidoptera), with an updated checklist of the Hyblaeidae of Nepal. Pp. 1–5 in: Hartmann, M., Barclay, M. & Weipert, J. (eds) Biodiversität und Naturlausstattung im Himalaya VIII. Erfurt (Naturkundemuseum).



Fig. 1. *Hyblaea puli* holotype.



Fig. 2. *Hyblaea puli* holotype, ventral.

Hyblaeidae

Currently, four *Hyblaea* Fabricius, 1793 species are known from Taiwan: *H. constellata* Guennée, 1852, *H. fortissima* Butler, 1881, *H. puera* (Cramer, 1777) (which probably constitutes a group of species), and *H. meifenga* Chen & Buchsbaum, 2020 (Heppner & Inoue 1992, Chen & Buchsbaum 2020). Hyblaeidae as a tropical lepidoptera family are now known with about 30 species occurring in South America, the Afrotropical, and Oriental region. Results of the last decade showed that species of the genus *Hyblaea* also occur in the Palearctic region and in higher elevations with the highest records from Nepal, where *H. nepalensis* Buchsbaum & Chen, 2021 is found at about 2600 m. In addition, *H. meifenga* Chen & Buchsbaum, 2020 has been documented in the high mountains of Taiwan at about 2200 m. Chandrasekhar et al. (2008) suggested that *H. constellata* is the same as *H. puera* which belongs to a species group with several similar but different species based on their DNA analyses (Chandrasekhar et al. 2008).

In the last decade, various studies analyzed the systematics of the Hyblaeidae with the main focus on Asia, Southeast Asia, and Australia (Buchsbaum et al. 2012, de Freina & Buchsbaum 2012, Buchsbaum et al. 2019, Chen & Buchsbaum 2020).

Hyblaeidae species are known as dayflying moths with an unsteady and fast flight shortly resting on leaves or on ground (own observations). Some species and specimens are also attracted to light (own observations).

Material and methods

The specimens were collected using a light trap. Genitalia preparation was done with KOH 10%; the genitalia were mounted in Euparal. Photos were taken with Olympus Tough TG-5 and edited for publication with Adobe Photoshop (private licence). Photos of the genitalia were taken with Olympus E-M1 on a Leica Microscope and edited for publication with Adobe Photoshop (private licence). The map showing the type locality was made with MapCreator 3.0 (private licence).

Hyblaea puli Buchsbaum & Chen sp. nov.

Figs 1–5

Holotype: ♀, Taiwan, Prov. Nantou; Huisun Forest Area, 500 m; 15 km N Puli, 7–8.VI.1997; leg. B. Herczig & L. Ronkay. Holotype in Collection Zoologische Staatssammlung München (ZSM), which will be deposited later in the Collection of the National Museum of Natural Science (NMNS), Taichung, Taiwan.



Fig. 3. *Hyblaea puli* holotype, genitalia.

Paratype: ♀, Taiwan, Nantou; Jenai, Kuanaoshan; 06/21/2002; C. C. Lo; None. Paratype in the Collection of the National Museum of Natural Science (NMNS), Taichung, Taiwan.

Description and differential diagnoses

Wingspan: 30–32 mm, Ø 31 mm, right forewing length: 13–15 mm, Ø 14 mm.

Ground colour of head, palps, body, wings and antenna brown. Abdominal segments above greyish brown, with yellowish orange rings. End of abdomen with orange hairs at anterior margin. Forewings from base to median area dark greyish brown. Postmedial area dark brown. Subterminal area dark greyish brown. Terminal part from apex to above tornus dark brown. Medially with a white mark. Hindwings brown with four orange spots.

Forewing underside dark brown with two pale orange bands from costa to medial area. Tornus with pale orange elongated spot. Narrowly pale yellow along dorsum. Hindwing underside pale orange with small black dots all over hindwings. From tornus to apex along termen black line.



Fig. 4. *Hyblaea puli* holotype, palps.

Female genitalia: Papillae anales with slightly longer hairs. Apophyses posteriores short, stout, strongly sclerotized. Ductus bursae wide, in middle

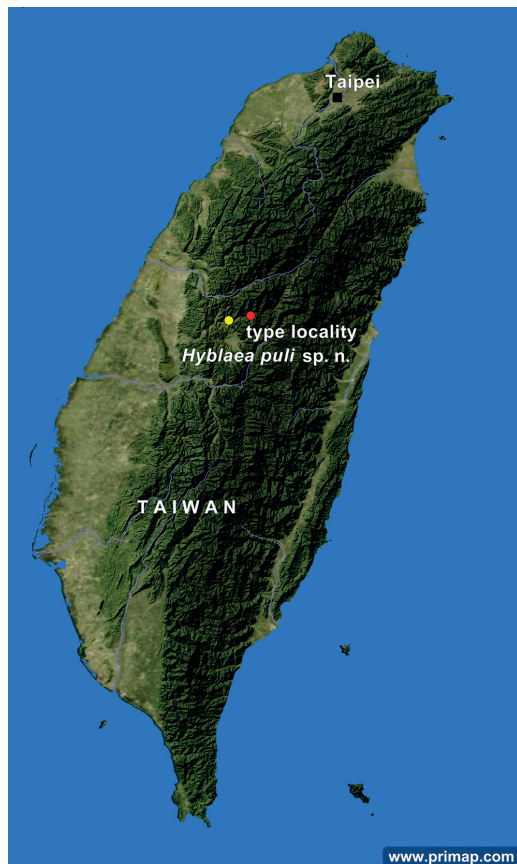


Fig. 5. Map with type collection sites in Taiwan. Red dot, holotype collection site; yellow dot paratype collection site.

part stronger sclerotized. Bursa copulatrix oval, with long, heavily thorny signum.

In *H. meifenga*, papillae anales wider, less sclerotized, with less and shorter hairs and ductus bursae slim long with short, stout less thorny signum.

Further differences to related species are indicated in Table 1.

Etymology. The new species is named after the Puli region located in the centre of Taiwan. The new species is also named after the two dogs (with names Alex and Toba) of the first author which belong to the dog race Puli (Hungarian sheepdogs). But there are no Pulis in Puli.

Discussion

Specimens of this species are typically rare and also come rarely to light. Even during the day, they are rarely collected. Own observations show that specimens of *Hyblaea puli* have a fast and unsteady flight during the day. They can mainly be found in forests. At light, most of the specimen rest in the shadow close to the lamp. As already mentioned, specimens of this genus in general are rarely collected and only few specimens are found in collections. The only exception is a mass occurrence which has been recorded once in Northeast Bali Island near Gilimanuk, with about more than 500 specimens on the screen beside the lamp (Buchsbaum et al. 2020.).

Taiwan is a hotspot of biodiversity with a high number of endemic species (e.g. Chou & Tang 2016, Chen et al. 2017, Liao & Chen 2017, Tseng et al. 2017, He et al. 2018, Buchsbaum & Chen 2019, Chen & Buchsbaum 2020, Chen et al. 2023) which have been recorded in the last decades. This is due in particular to its special location between the Oriental and Palearctic zoogeographical regions (e.g. Olson et al. 2001, Schintlmeister 2003, Yen et al. 2003, Kalmar & Currie 2006, Rueda et al. 2013, Liao & Chen 2017, Whittaker et al. 2017, Buchsbaum et al. 2018, He et al. 2018, Buchsbaum & Grehan 2019, Buchsbaum et al. 2023, Chen et al. 2023, Grehan et al. 2023).

The collection sites of the new species are situated in the lowland forests at sea level to about 500 m which are more similar to subtropical and tropical realms than to the more Palearctic areas above 1000 m in Taiwan (Mey & Speidel 2003, Whittaker et al. 2017, Buchsbaum et al. 2023, Chen et al. 2023).

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Table 1. Differences to the most similar *Hyblaea* species.

Characteristics	<i>Hyblaea puli</i> sp. nov.	<i>Hyblaea meifenga</i>	<i>Hyblaea constellata</i>
Head, thorax, labial palps	Ground colour brown	Greyish dark brown	Dark brown
Body	Abdomen dorsally greyish brown, yellowish orange ringed, abdominal end with orange hairs	Black, abdominal end with greyish brown hairs	More or less uniform dark brown
Forewings upper side	From base to medial area dark greyish brown, postmedial area dark brown, subterminal area dark, greyish brown, terminal area from apex to above tornus dark brown	Darker brown, without white median marks	Dark brown, apex with white cilia of termen, reniform black stigma
Forewings underside	Dark brown with two pale orange bands from costa to medial area, with an elongate orange spot at tornus, dorsally with pale yellow mark	Paler brown area with pink orange costa and apex	Dark brown with dark pink apex with white cilia on apex
Hindwings upper side	Brown with four orange spots	Brown, the four orange spots larger and paler	Paler, with larger spot near base and terminal spot, with trailing line to tornus
Hindwings underside	Pale orange with small black dots all over surface, black line from apex to anal angle, parallel to wing margin	Larger black dots at anal angle and in medial area, with darker brownish base	Pale orange, terminal black long spot and dark brown discal spot
Female genitalia	Papillae anales with short hairs. Apophyses posteriores short, stout, strongly sclerotized. Ductus bursae wide, in middle part stronger sclerotized. Corpus bursae oval, with long, heavily thorny signum	Papillae anales wider, less sclerotized, with less and shorter hairs. Ductus bursae slimmer, not sclerotized, long, corpus bursae with short, stout less thorny signum	Not available
Distribution	Endemic in Taiwan, at about 500 m a.s.l.	Endemic in Taiwan, above 2100 m a.s.l., highest known Hyblaeidae species in Taiwan	<i>H. constellata</i> species complex; widely distributed from India, Burma, Japan, Taiwan, Sumatra to Australia

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