

## The species of the genus *Triraphis* Ruthe, 1855 (Hymenoptera: Braconidae: Rogadinae) in the fauna of the Korean Peninsula

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### Abstract

The species of the rogadine genus *Triraphis* Ruthe in the fauna of the Korean Peninsula is reviewed. A new species *Triraphis storozhenkoi* Belokobylskij & Ku, **sp. nov.** is described and illustrated. The species *Triraphis brevis* Chen & He, 1997, *T. flavus* Chen & He, 1997, and *T. terebrans* Chen & He, 1997 are recorded in the fauna of peninsula for the first time. An illustrated key for the six species known from Korea is provided.

**Key words:** Rogadini, host mummification, koinobionts, new species, new records. Eastern Asia

### Introduction

The genus *Triraphis* Ruthe, 1855 (Braconidae: Rogadinae) is a medium-sized genus from the tribe Rogadini with more than 75 known species in the Palaearctic (6 species), Oriental (12, but they are partly distributed on the border with the eastern Palaearctic), Nearctic (3, with single species distributed also in the north Neotropics), and Neotropical (57 species) regions (Yu *et al.* 2016; Sharkey *et al.* 2021; Jasso-Martínez *et al.* 2024). The members of this genus are predominantly solitary (with at least one known gregarious species: Watanabe 1970) koinobiont endoparasitoids of exposed and semi-concealed lepidopteran larvae which are characterized by pupating within the mummified host larvae (Zaldívar-Riverón *et al.* 2008; Jasso-Martínez *et al.* 2021).

The known lepidopteran hosts of *Triraphis* are belonging predominantly to the families Limacodidae, Riodinidae and Zygaenidae, but rarely it has been reared from the species of the families Dalceridae, Erebiidae, Lycaenidae, Megalopygidae and Tortricidae. The adults of this genus are often attracted by light during night period.

The Palaearctic fauna of the discussed genus is rather reduced and consists of only six known species. Only *Triraphis tricolor* (Wesmael, 1838) has a wide Euro-Asiatic distribution, and other species have been described from eastern Asia (China, Korea and Japan) (Watanabe 1970; Papp 1995; Chen & He 1997). However, at least part of species of this genus from China were recorded from the border of the Oriental and eastern Palaearctic regions, namely *T. brevis* Chen & He, 1997; *T. flavus* Chen & He, 1997; *T. fuscipennis* Chen & He, 1997; *T. longwangensis* Chen & He, 1997; *T. melanus* Chen & He, 1997; and *T. terebrans* Chen & He, 1995. Thus, they may be found at least in the south-eastern part of the Palaearctic region as well, and some of them are recorded here to belong to the fauna of the Korean Peninsula.

This study provides illustrated description of the new *Triraphis* species from the Korean Peninsula, the new records of taxa in the fauna of the region, and a key for determination of the known Korean species of this genus.

## Materials and methods

The terminology employed for the morphological features, sculpture, and body measurements follows Belokobylskij & Maetô (2009) and Belokobylskij *et al.* (2024). The wing venation nomenclature follows Belokobylskij & Maetô (2009) and Belokobylskij *et al.* (2024), with the terminology of van Achterberg (1993) shown in parentheses. The new distribution records presented in this paper are marked with an asterisk (\*).

The specimens were examined using an Olympus SZ51 microscope. Photographs were taken with an Olympus OM-D E-M1 digital camera mounted on an Olympus SZX10 microscope (Zoological Institute of the Russian Academy of Sciences, St Petersburg, Russia). Image stacking was performed using Helicon Focus 8.0. The figures were produced using the Adobe Photoshop CS6 program.

The specimens examined in this study are deposited in the collections of the Hungarian Natural-History Museum (Budapest, Hungary; **HNHM**), National Institute of Biological Resources (Incheon, Republic of Korea; **NIBR**), the Science Museum of Natural Enemies (Geochang, Republic of Korea; **SMNE**), and the Zoological Institute of the Russian Academy of Sciences (St Petersburg, Russia; **ZISP**).

Abbreviations of Korean provinces used in this paper as follows: CB—Chungcheongbuk-do, CN—Chungcheongnam-do, GB—Gyeongsangbuk-do, GG—Gyeonggi-do, GN—Gyeongsangnam-do, GW—Gangwon-do, JB—Jeollabuk-do, JJ—Jeju-do, JN—Jeollanam-do.

## Taxonomic part

### Family Braconidae

### Subfamily Rogadinae

### Tribe Rogadini

### Genus *Triraphis* Ruthe, 1855

*Triraphis* Ruthe, 1855: 292; Shenefelt 1975: 1207 (as synonym of *Pelecystoma*); van Achterberg 1991: 62 (resurrection); Papp 1995: 123; Chen & He 1997: 90; Belokobylskij 2000: 98; Valerio & Shaw 2015: 501; Yu *et al.* 2016; Belokobylskij *et al.* 2019: 328.

*Pelecystoma*: Watanabe 1970: 117; Tobias 1971: 218; 1976: 89; van Achterberg 1991: 62.

**Type species.** *Exothecus discolor* Ruthe, 1855 (= *Pelecystoma tricolor* Wesmael, 1838), by monotypy.

**Diagnosis of the genus.** Body small or medium-sized. Head transverse (dorsal view); vertex and temple usually smooth; ocelli often at least weakly enlarged; ocellar triangle with base slightly larger than its sides; frons weakly concave, without median keel or furrow; eyes glabrous, bean-shaped; occipital carina present at most part, distinct, always interrupted dorsally, not joined below with hypostomal carina and separated at short distance; hypoclypeal cavity subcircular, medium-sized; maxillary palp 6-segmented; labial palp 4-segmented; third segment of maxillary palp in female weakly widened, not unguulate. Antenna setiform, multisegmented; scape rather wide and elongated, without transformation; apical segment usually with distinct and elongate apical ‘spine’. Mesosoma short and high; mesonotum anteriorly distinctly and subvertically elevated above pronotum; notauli distinct and crenulate, entirely deep; precoxal sulcus distinct, usually narrow, oblique, straight; prepectal carina distinct and complete; propodeum with or without antero-lateral areas delineated by carinae, lateral tubercles usually present, wide and low. Hind femur long and relatively wide; hind trochanter almost as long as trochantellus; inner distal margin of hind tibia with comb of dense pale setae. Claw of hind tarsus usually with high, wide and acuminate basal lobe. Fore wing radial (marginal) cell usually not shortened; radial vein (r) arising before middle of pterostigma; recurrent vein (m-cu) weakly antefurcal; nervulus (cu-a) almost straight, postfurcal; medial (1-M) and recurrent vein (m-cu) subparallel or weakly convergent posteriorly. In hind wing, hamuli 3; radial (marginal) cell widened in basal half, narrow and subparallel in apical half; submedial (subbasal) cell medium-sized; first mediocubital abscissa subequal, weakly longer or shorter than second abscissa (1-M), nervellus (cu-a) weakly curved; recurrent vein (m-cu) always absent. Metasoma with dorsally visible five–six tergites; second to sixth metasomal tergites with lateral crease and separated

laterotergites; first metasomal tergite rather wide and short, with distinct dorsope, dorsal carinae often incomplete and distally not fused to each other, not forming basal subtriangular area; second metasomal suture distinct and curved; second tergite without delineated basal area; ovipositor usually short, only rarely relatively long.

**Hosts.** Lepidopterans larvae from the genera *Euproctis* Hübner (Erebidae); *Acraga* Walker (Dalceridae); *Achardia* Hübner, *Adoneta* Clemens, *Alarodia* Möschler, *Apoda* Haworth, *Euclea* Hübner, *Heterogenea* Knoch, *Isa* Packard, *Lithacodes* Packard, *Microleon* Butler, *Monema* Walker, *Natada* Walker, *Parasa* Moore, *Perola* Walker, *Phrixolepia* Butler, *Prolimacodes* Schaus, *Scopelodes* Westwood, *Tortricidia* Packard, *Vipsania* Druce (Limaecodidae); *Arawacus* Kaye, *Ocaria* Clench (Lycaenidae); *Norape* Walker (Megalopygidae); *Emesis* Fabricius, *Eurybia* Illiger, *Melanis* Hübner, *Napaea* Hübner (Riodinidae); *Archips* Hübner, *Tortrix* Linnaeus (Tortricidae); *Artona* Walker, *Harrisina* Packard (Zygaenidae) (Yu *et al.* 2016).

**Distribution.** Nearctic, Neotropical, Oriental and Palaearctic regions.

**Remarks.** The species of this genus are characterised by distinct intraspecific variation of the body colour. Such pattern consisting of a combination of predominantly yellow or pale brown colour with a different intensity of dark shades (dark brown, dark reddish brown to black) including spots or stripes on the head, mesosoma and metasoma. The use of the colour pattern in the species diagnostic of the genus *Triraphis* must be used carefully because it can lead to errors in determination. However, because the many Asian species were described with using of the colour pattern (which was also included in the diagnostic key) (Chen & He 1997) we obliged to use these characters for the species determination before receiving of the genetic data for these species and future estimation of the species limits.

### ***Triraphis brevis* Chen & He, 1997**

(Figs 1A; 2A, F; 3A)

*Triraphis brevis* Chen & He, 1997: 95; Yu *et al.* 2016.

**Material examined. South Korea.** [GB] Gyeongju-si, Gangdong-myeon, Dangu-ri, 36°3'48.06" N 129°16'16.25" E, Malaise trap, 15–28.VIII. 2017 (Hyung-Keun Lee), 1 female (ZISP); Yeongyang-gun, Malaise trap, 8–20.VIII.2018 (Hyung-Keun Lee), 1 female (SMNE); Uiseong-gun, Geumseong-myeon, Sujeong-ri, Mt. Bibongsan, sweeping, 20 & 21.VII.1999 (Tae-Ho An), 2 females (SMNE).

[GG] Suwon-si, Mt. Yeogisan, light trap, 8.IX.1997 and 28.VIII.1998 (June-Yeol Choi), 2 females (SMNE).

[GN] Uiryeong-gun, Malaise trap, 20.VII–3.VIII.2018 (Hyung-Keun Lee), 1 female (NIBR); Jinju, Choeon-dong, light trap, 12–13.VIII.1993 (Deokseo Ku), 1 female (ZISP); Jinju-si, Geumsan-myeon, Galjeon-ri, Temple Cheonggoksa, 11.IX.1993 (Jesik Jeon), 1 female, (SMNE); Jinju-si, Gajwa-dong, Malaise trap, 29.VII–4.VIII. 1989 (collector unknown), 1 female (SMNE); Goseong-gun, Sangri-myeon, Osan-ri, Mt. Odusan, Light trap, 10–11.IX.1999 (Jesik Jeon), 1 female (SMNE); Doksan-ri, Naedong-myeon, Jinju-si, (near forest road), sweeping, 19.VII.2003 (Tae-Ho An), 1 female (SMNE).

[GW] Goseong-gun, Malaise trap, 7–21.VIII.2018 (Hyung-Keun Lee), 1 female (SMNE).

[JN] Gurye-gun, Gwangui-myeon, Ondang-ri, ecological forest, 35°17'8.87" N, 127°27'8.72" E, Malaise trap, 7–22.VIII.2018 (Hyung-Keun Lee), 1 female (SMNE); Jangseong-Gun, Samgye-myeon, Singi-ri, Mt. Taecheong, Temple Bongjeongsa, light trap, 11.VII.1998 (Deokseo Ku), 1 female (SMNE); Suncheon-si, Seokhyeon-dong, 34°58'56.59" N 127°27'40.56" E, Malaise trap, 15–28.VIII. 2017 (Hyung-Keun Lee), 1 female (SMNE).

**Host.** Unknown.

**Distribution.** \*Korean Peninsula; China (Fujian, Hubei, Zhejiang).

### ***Triraphis flavus* Chen & He, 1997**

(Figs 1B; 2B, G; 3B)

*Triraphis flavus* Chen & He, 1997: 97; Yu *et al.* 2016.

**Material examined. South Korea.** [GN] Mt. Jalpuyeosan, san 34–48, Sansu-dong (Island), Sacheon-si, Malaise trap, 7.VII–10.VIII.2024 (Deokseo Ku, Jiwon Park, Danbi Yun), 2 females (SMNE, ZISP).

[JJ] Dongbok-ri, Gujoa-up, Jeju-si, Jeju-do, Malaise trap, 12–26.VIII.2017, 1 female (SMNE); near the Manjanggul Cave, Woljeong-ri, Gujwa-eup, Jeju-si, Malaise trap, 1–15.V.2024 (Deokseo Ku, Muncheol Kwon), 2 females (SMNE, ZISP).

[JN] Oenarodo, Bongnae-myeon, Goheung-gun, Malaise trap, 19.VII–2.VIII.2020 (Deokseo Ku, Jaehyeon Lee), 1 female (NIBR); Jeonnam, Yecheon, Nammyeon, 4.VIII.1993 (Deokseo Ku), 1 female (ZISP).

**Host.** Unknown.

**Distribution.** \*Korean Peninsula; China (Zhejiang, Guangdong).



**FIGURE 1.** Habitus in lateral (A, B, D, E) and dorsal (C) views of *Triraphis brevis* Chen & He (A), *T. flavus* Chen & He (B), *T. pullus* Papp (C), *T. terebrans* Chen & He (D), and *T. tricolor* (Wesmael) (E).



***Triraphis pullus* Papp, 1995**

(Figs 1C; 2C; 3C)

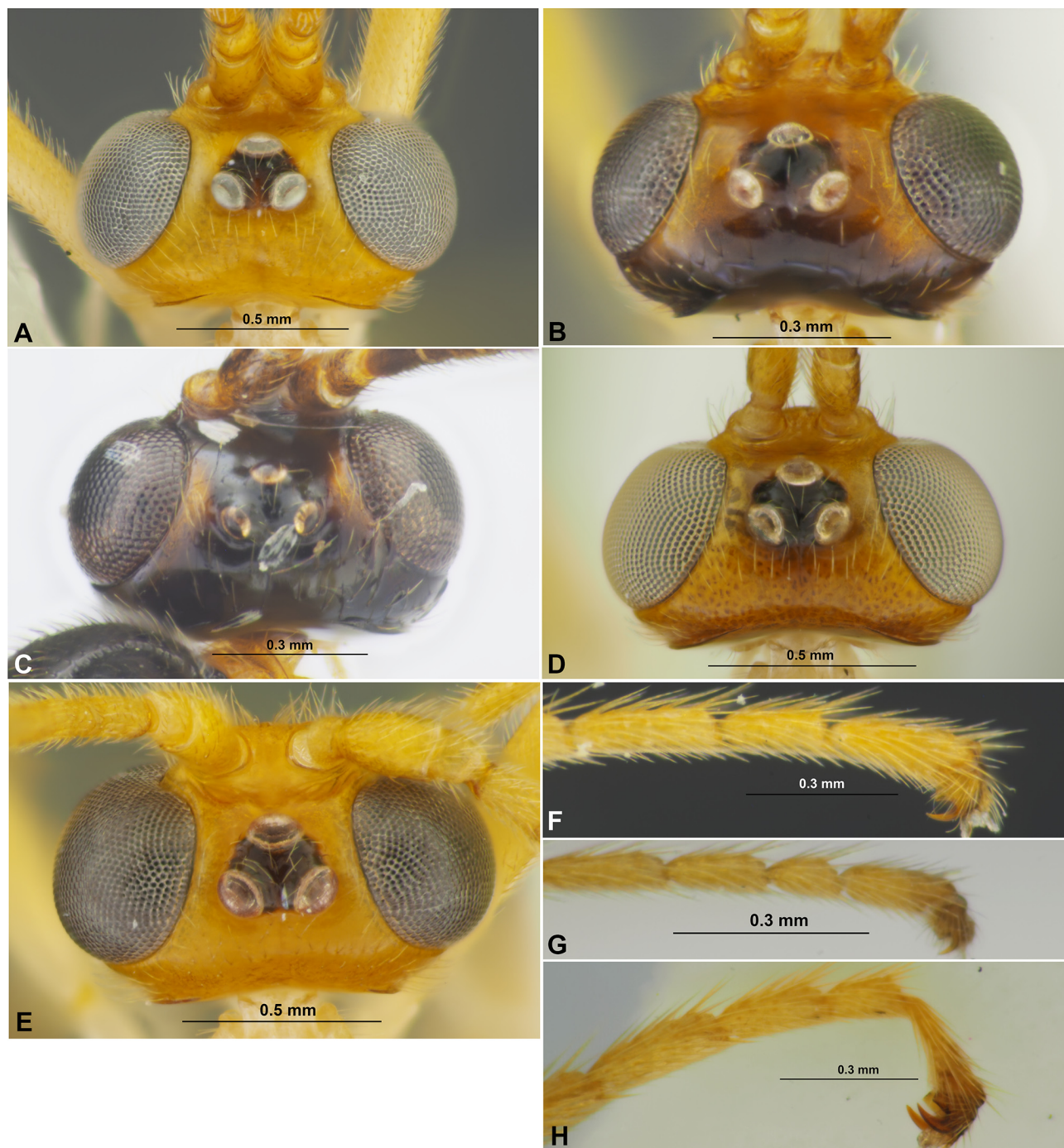
*Triraphis pullus* Papp, 1995: 124; Belokobylskij 2000: 98; Yu *et al.* 2016.

**Material examined. North Korea.** “[North] Korea, Pyongyang City, Mt. Ryongak, 31 May 1985, leg. Vojnits et Zombori, NO. 963”, 1 female (holotype), 1 female and 1 male (paratypes) (HNHM); same locality, but “taken at light at night, 30 May 1985, leg. Vojnits et Zombori, NO. 962”, 1 male (paratype) (HNHM) (Papp, 1995).

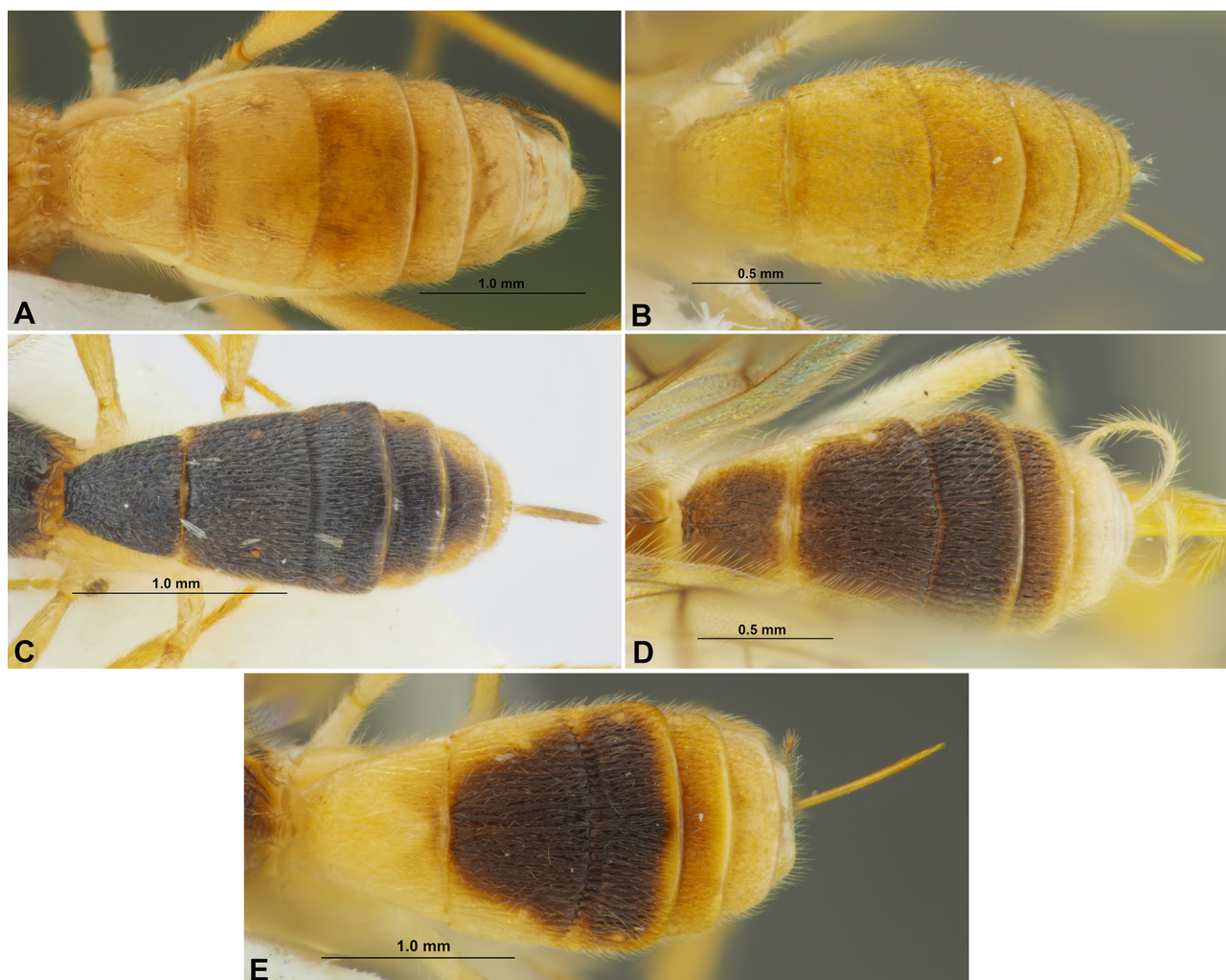
**South Korea.** [GN] Hadong-gun, Cheongam-myeon, Mukgye-ri, 35.23625° N, 127.70130° E, 1.VIII.2024 (E. Tselikh), 7 females, 2 males (SMNE, ZISP).

**Host.** Unknown.

**Distribution.** Korean Peninsula; Russia (south of Far East).



**FIGURE 2.** Head in dorsal view (A–E) and claw of hind leg (F–H) of *Triraphis brevis* Chen & He (A, F), *T. flavus* Chen & He (B, G), *T. pullus* Papp (C), *T. terebrans* Chen & He (D), and *T. tricolor* (Wesmael) (E, H).



**FIGURE 3.** Metasoma in dorsal view of *Triraphis brevis* Chen & He (A), *T. flavus* Chen & He (B), *T. pullus* Papp (C), *T. terebrans* Chen & He (D), and *T. tricolor* (Wesmael) (E).

***Triraphis storozhenkoi* Belokobylskij & Ku, sp. nov.**

<http://zoobank.org/E83FCE21-7181-4ABA-8564-0FD15181B6C3>

(Figs 4; 5)

**Type material. Holotype:** female, “Korea: Jeollanam-do (JN), Gangjin-gun, Gundong-myeon, Deokcheon-ri, 28.VIII–11.IX.2017, Hyung-Keun Lee, Malaise trap, 34°55′47.64″ N, 126°57′49.37″ E” (NIBR). **Paratype.** 1 female, “Jeollanam-do (JN), Wando, 7–20.VIII.2018, Hyung-Keun Lee, Malaise trap” (ZISP).

**Description. Female.** Body length 3.6–3.8 mm; fore wing length 3.2–3.3 mm. Head width (dorsal view) 1.8–1.9 × its median length. Occipital carina widely interrupted dorsally. Head behind eye (dorsal view) strongly and curvedly narrowed; transverse diameter of eye 2.7–2.8 × length of temple. Ocelli enlarged, arranged in triangle with base 1.1–1.2 × its sides; POL 0.6–0.8 × Od, 1.0–1.2 × OOL; Od 1.5–1.6 × OOL. Eye high, 1.4–1.5 × higher than broad. Face weakly convex, its width 0.9–1.0 × height of face and clypeus combined, ~ 0.6 × height of eye. Hypoclypeal depression subcircular, its width 1.3–1.4 × distance from edge of depression to eye, ~ 0.5 × minimum width of face. Malar space ~ 0.2 × height of eye, 0.6–0.8 × basal width of mandible. Head below eyes (anterior view) distinctly and almost linearly narrowed. Third and fourth segments of female maxillary palpus weakly widened.

Antenna slender, setiform, 34–36-segmented, about 1.5 × longer than body. Scape relatively long, 1.5–1.8 × longer than maximum width. First flagellomere 2.5–2.8 × longer than its apical width, 1.1–1.2 × longer than second flagellomere. Penultimate flagellomere 3.0–3.3 × longer than wide, 0.6–0.8 × as long as first flagellomere, 0.7–0.8 × as long as apical flagellomere. Apical flagellomere acuminate and with distinct ‘spine’.



Mesosoma 1.4–1.5 × longer than high. Mesoscutum high and curvedly elevated above pronotum (lateral view), approximately as wide as its medial length (dorsal view). Prescutellar depression (scutal sulcus) long, about 0.5 × as long as scutellum, with distinct numerous carinae, partly reticulate between carinae. Precoxal sulcus distinct, relatively wide, short, strongly oblique, crenulate. Metanotum without dorsal tooth (lateral view). Propodeum distinctly and almost straightly oblique in posterior 0.7–0.8.

Wings. Fore wing 2.7–2.8 × longer than its maximum width. Radial vein (r) arising distinctly before middle of pterostigma. Radial (marginal) cell not shortened; metacarp (1-R1) 1.2–1.3 × longer than pterostigma. First radial abscissa (r) 0.7–0.9 × as long as maximum width of pterostigma. Second radial abscissa (3-SR) ~ 2.5 × longer than first abscissa (r) and formed very obtuse angle with it, 0.5 × as long as third radial abscissa (SR1), 1.5–1.6 × longer than first radiomedial vein (2-SR). Second radiomedial (submarginal) cell long, 2.5–2.6 × longer than maximum width, 1.5–1.6 × longer than brachial (subdiscal) cell. First medial abscissa (1-SR+M) weakly sinuate. Recurrent vein (m-cu) weakly curved, 4.5–5.5 × longer than second abscissa of medial vein (2-SR+M), 0.9–1.0 × as long as first radiomedial vein (2-SR). Nervulus (cu-a) weakly curved, weakly oblique, strongly postfurcal, distance (1-CU1) between basal vein (1-M) and nervulus (cu-a) 0.8 × nervulus (cu-a) length; first abscissa of cubital vein (1-CU1) 0.2–0.3 × its second abscissa (2-CU1). In hind wing, radial (marginal) cell weakly widened in basal 0.3, distinctly narrowed towards apex. Radial vein (SR) arising from costal vein (2-SC+R) closely to basal vein (r-m); third abscissa of costal vein (2-SC+R) short, weakly elongate. Nervulus (cu-a) weakly curved. First abscissa of mediocubital vein (M+CU) 1.1–1.3 × longer than second abscissa (1-M).

Legs. Hind femur 4.0–4.2 × longer than wide. Inner longest spur of hind tibia ~ 0.4 × as long as hind basitarsus. Hind tarsus 0.9 × as long as hind tibia. Hind basitarsus 0.5–0.6 × as long as second to fifth segments combined. Second segment of hind tarsus 0.40–0.45 × as long as basitarsus, ~ 0.8 × as long as fifth segment (without pretarsus). Claw without acuminate basal lobe, but strongly expanded basally and distinctly evenly narrowed towards apex.

Metasoma. Length 1.6–2.0 × larger than its maximum width. First tergite short, distinctly and almost evenly widened from base to apex; length of tergite 0.8–0.9 × its posterior width, posterior width 2.3–2.4 × larger than its anterior width. Basal area of first tergite wide, rather long and semi-oval. Second tergite without basal area, its medial length 0.6 × anterior width, 1.6–1.8 × length of third tergite. Suture between second and third tergites deep and crenulate. Ovipositor sheath about as long as first tergite, 1.5–1.6 × longer than hind basitarsus, ~ 0.2 × as long as fore wing.

Sculpture and pubescence. Head mainly smooth; face weakly reticulate, smooth medially. Mesoscutum, scutellum and mesopleuron smooth. Propodeum smooth anteriorly and reticulate in remaining part, with irregular or relatively regular carinae delineated rather narrow areola, its length 2.0–2.3 × maximum width, antero-medial carina distinct and relatively short. Hind leg smooth. First to fourth metasomal tergites entirely and distinctly densely striate with dense and weak reticulation between striae; fifth tergite laterally striate with reticulation, but only reticulate medially.

Colour. Head and mesosoma mainly yellow to brownish yellow, propodeum at least partly fuscous. Metasoma light reddish brown or brownish yellow, whitish yellow laterally and posteriorly, first tergite with large or small dark medial spot. Antenna mainly yellow, evenly and faintly fuscous distally. Palpi whitish. Legs mainly yellow, almost white in their basal quarters. Wing mainly hyaline, with faint obfuscation along veins medially; pterostigma mostly brown, but with small basal yellow spot, costal vein (C+SC+R) mainly yellow.

*Male.* Unknown.

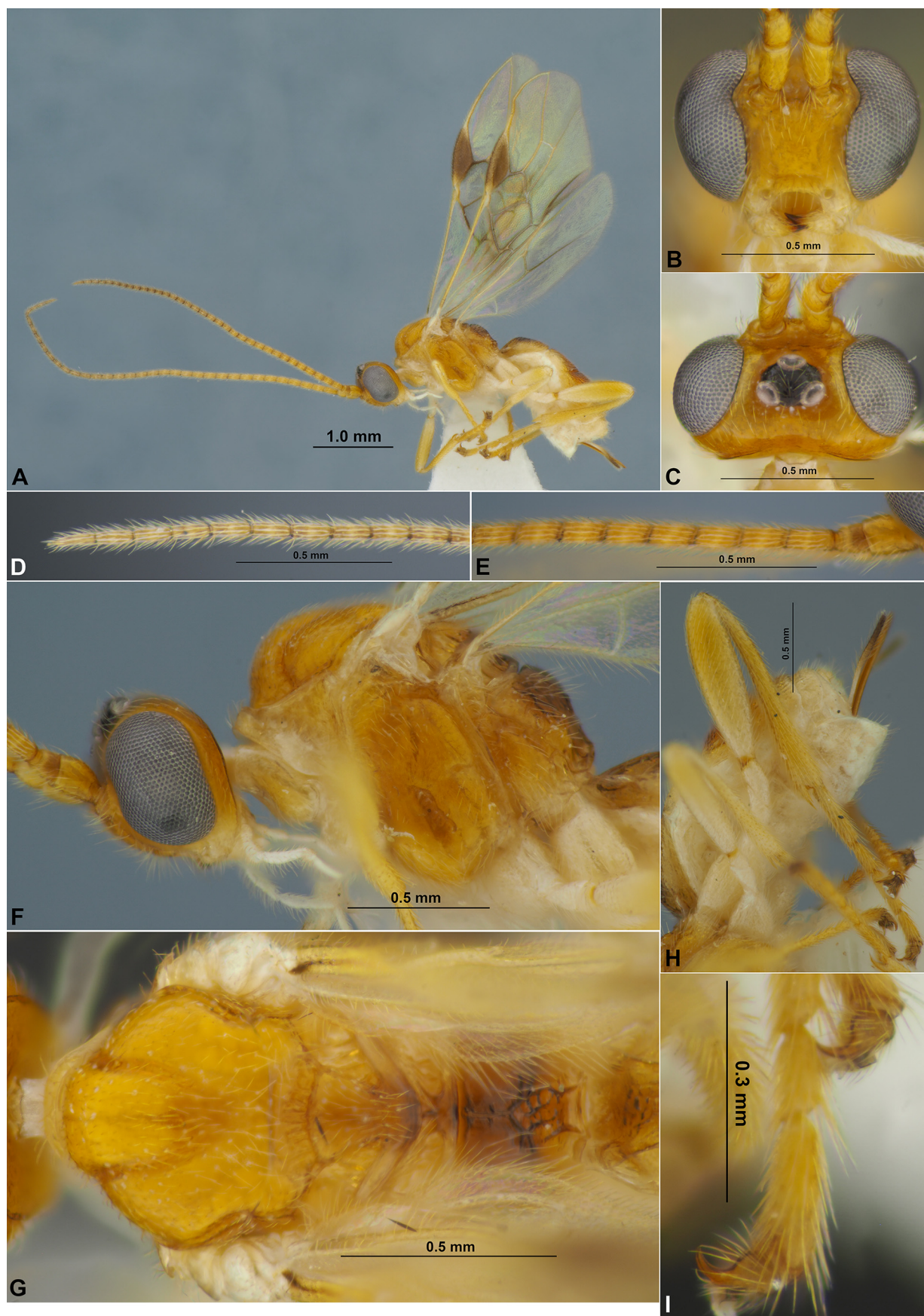
**Host.** Unknown.

**Distribution.** Korean Peninsula.

**Etymology.** This new species is named in honour of Prof. Sergey Yurievich Storozhenko, the well-known Russian orthopterologist, dedicated in celebration of his upcoming 70th birthday.

**Comparative diagnosis.** This new species distinctly differs from all known *Triraphis* species by the absence of the acuminate basal lobe on the tarsal claws.

According to the key of *Triraphis* species by Chen & He (1997), the new species reminds of *T. flavus* Chen & He, 1997 from China (Zhejiang and Guangdong Provinces) (Chen & He 1997) and the Korean Peninsula (this study), but it differs, beside of the shape of the claw, also by having the head (dorsal view) curvedly narrowed behind eye (almost directly narrowed in *T. flavus*), the frons and malar space smooth (with the transverse striae or rugosity in *T. flavus*), and the hind femur 4.0–4.2 × longer than wide (5.0 × in *T. flavus*).



**FIGURE 4.** *Triraphis storozhenkoi* **sp. nov.** (female, holotype). (A) Habitus, lateral view. (B) Head, front view. (C) Head, dorsal view. (D) Apical antennomeres. (E) Basal antennomeres. (F) Head and mesosoma, lateral view. (G) Mesosoma, dorsal view. (H) Hind leg. (I) Claw of hind leg.





**FIGURE 5.** *Triraphis storozhenkoi* sp. nov. (female, holotype). (A) Wings. (B) Propodeum, metasoma and ovipositor, dorsal view. (C) Metasoma and ovipositor, lateral view.

### ***Triraphis terebrans* Chen & He, 1995**

(Figs 1D; 2D; 3D)

*Triraphis terebrans* Chen & He in Chen *et al.* 1995: 256; 1997: 105; Yu *et al.* 2016.

**Material examined. South Korea.** [GB] Nongam-myeon, Jidong1-ri, Munkyeong-si, 36°33'35.9" N, 128°03'15.2" E, 18.VII–12.VIII.2020 (Seong-Su Kim) 1 female (ZISP).

[GG] Seoul, Dongdaemun-gu, Hoegi-ro, 57, National Recreation Forest Management Office, Hongneung Arboretum, light trap, VII.1998 (Seong-Ho Kang), 1 female (SMNE); same label, but 3.IX.1998, 2 females (NIBR, SMNE).

[JN] Yeongam-gun, Gunseo-myeon, Dogap-ri, Mt. Wolchulsan, Temple Dogapsa, sweeping, 25.VII.1999 (Eunsuk Gang), 1 female (SMNE).

**Host.** Unknown.

**Distribution.** \*Korean Peninsula; China (Zhejiang).

### ***Triraphis tricolor* (Wesmael, 1838)**

(Figs 1E; 2E, H; 3E)

*Pelecystoma tricolor* Wesmael, 1838: 93; Shenefelt 1975: 1209.

*Rogas tricolor*: Tobias 1986: 85; Papp 1989: 86.

*Triraphis tricolor*: van Achterberg 1991: 62; Papp 1995: 124; Belokobylskij 2000: 100.

*Diachasma rimulosa* Marshall, 1898: 238; van Achterberg 1991: 63 (as synonym); Yu *et al.* 2016.

*Exothecus discolor* Ruthe, 1855: 291; Shenefelt 1975: 1209; van Achterberg 1991: 63 (as synonym); Yu *et al.* 2016.

*Pelecystoma solitarius* Watanabe, 1970: 118; Papp 1995: 124 (as synonym); Yu *et al.* 2016.

**Material examined. South Korea.** [CB] Jecheon-si, Mt. Wolaksan, Mireuksaji, 14.VIII.1987 (collector unknown), 1 female (SMNE); Danyang-gun, Danyang-eup, Cheondong-ri, Mt. Sobaeksan, Cheondong valley, 14.VIII.1998 (Jungseok Park), 1 female (SMNE).

[CN] Geumsan-gun, Gunbuk-myeon, Sanan-ri, Jajinbangi, Malaise trap, 20–27.VII.1998 (P. Tripotin), 2 females (SMNE); Geumsan-gun, Nami-myeon, Seokdong-ri, Temple Boseoksa, Malaise trap, 17–21.VIII.1998 (P. Tripotin), 2 females (SMNE).

[GB] Uiseong-gun, Angye-myeon, Dodeok-ri, 36°25'49.02" N, 128°27'35.7" E, Malaise trap, 16–29.VIII.2017 (Hyung-Keun Lee), 1 female (SMNE); Cheonbu3-gil, Buk-myeon, Ulleung-gun, Malaise trap, 16–30.VIII.2017 (Deokseo Ku), 1 female (ZISP); Uiseong-gun, Geumseong-myeon, Sujeong-ri, Mt. Bibongsan, sweeping, 20.VII.1999 (Tae-Ho An), 1 female (SMNE); same label, light trap, 20–21.VII.1999 (Tae-Ho An), 1 female (SMNE); Daegu-si, Gunwi-gun, Goro-myeon, Gaam-ri, Mt. Seonamsan, Apgokam, sweeping, 4.IX.1998 (Mingyu Lee), 1 female (SMNE); Pohang-si, Jukjang-myeon, Sangok-ri, Mt. Naeyeonsan, sweeping, 16.VIII.1997 (Jesik Jeon), 1 female (SMNE);

[GG] Seoul-si, Hongreung Arboretum, VII and 25.VIII.1998 (Sung-Ho Kang), 2 females (SMNE); Suwon-si, Mt. Yeogisan, light trap, 14.VIII and 18.IX.1995, 28.VIII and 28.IX.1998 (June-Yeol Choi), 4 females (SMNE); Uiwang-si, Cheonggye-dong, Mt. Cheonggyesan, Temple Cheonggyesa, light trap, 16.VI.1998 (Deokseo Ku), 1 female (SMNE).

[GN] Geochang-gun, Geochang-eup, Science Museum of Natural Enemies (SMNE), light trap, 13.VIII.2016 (Deokseo Ku, Hye-Rin Lee), 1 female (SMNE); same label, but Malaise trap, 25.VIII–8.IX.2021 (Deokseo Ku, Jaehyeon Lee), 1 female (SMNE); same locality, but 20.VII.2024 (E. Tselikh), 1 female (ZISP); Geochang-gun, Science Museum of Natural Enemies, Malaise trap, 16.IX–4.X.2020 (Deokseo Ku), 1 female (ZISP); Geochang-gun, Namsang-myeon, Jeoncheok-ri, 35°37'15.3" N, 127°57'51.4" E, 22.VI.2023 (S. Belokobylskij), 1 female (ZISP); Changryeong-gun, Changryeong-eup, Mt. Hwawangsan, light trap, 29.VII.1998 (Deokseo Ku), 1 female (SMNE); Jinju-si, Naedong-myeon, Doksan-ri, forest road, Malaise trap, 21.VI–2.VII.2003 and 19.VII–10.VIII.2003 (Tae-Ho An), 2 females (SMNE); Jinju-si, Gajwa-dong, Malaise trap, 15–22.IX.1993 (Deokseo Ku), 1 female (SMNE); Sacheon-si, Gonyang-myeon, Daejin-ri, Malaise trap, 19.VIII–9.IX.2021 (Seonghun Jeong), 2 females (SMNE); Hadong-gun, Bukcheon-myeon, Jikjeon-ri, Mt. Bongmyeonsan, light trap, 25.VII.2015 (Deokseo Ku, Tae-Ho An),



1 female (SMNE); Goseong-gun, Gacheon-myeon, Temple Okcheonsa, light trap, 28.–29.VII.1995 (Deokseo Ku), 1 female (SMNE); Goseong-gun, Sangri-myeon, Gobong-ri, Mt. Baekunsan, light trap, 14.VII.2017 (Deokseo Ku, Tae-Ho An, Hye-Rin Lee), 1 female (SMNE); Geoje-si, Hacheong-myeong, Eoon-ri, Chilcheollyangsup-gil, 34°59'24.6" N, 128°38'27" E, 2.VII.2023 (S. Belokobylskij), 1 female (ZISP); Geoje-si, Dundook-myeong, Sangdun 5-gil 46, Bongeunsa Mt., Sanbangsan, 34.8661797° N, 128.5422816° E, 26.VII.2024 (S. Belokobylskij), 2 females (ZISP); same label, but (V. Chemyreva), 1 female (ZISP); Daegu, Dalseong-gun, Yang-ri, 35.71331° N, 128.51140° E, 5 and 11.VIII.2024 (S. Belokobylskij), 1 female (ZISP); Jinju-si, Ilbanseong-myeon, Gaseon-ri, Malaise trap, 6–20.VII.2024 (Tae-Ho An), 1 female (SMNE); Jinju-si, Gajwa-dong, Malaise trap, 15–21.VII.1989 (collector unknown), 1 female (SMNE); Sacheon-si, Island-Sinsudo, Mt. Jalpuyeosan, Malaise trap, 7.VII–10.VIII.2024 (Deokseo Ku, Jiwon Park, Danbi Yun), 1 female (SMNE).

[JB] Jangsu-gun, Janggye-myeon, Myeongdeok-ri, Yuksipryeong resting place, light trap, 1.VIII.2016 (Deokseo Ku), 1 female (SMNE); Hakseon-ri, Donghyang-myeon, Jinan-gun, black light, Bucket trap, 9.IX.2023 (Hyung-Keun Lee), 1 female (SMNE); Namwon-si, Sannae-myeon, Junghwang-ri, Mt. Sambongsan, Seojinam, 14.VIII.1997 (Jungseok Park), 1 female (SMNE);

[JN] Jangseong-Gun, Samgye-myeon, Singi-ri, Mt. Taecheong, Temple Bongjeongsa, light trap, 11.VII.1998 (Deokseo Ku), 1 female (SMNE); Gurye-gun, Sandong-myeon, Jwasa-ri, Simwon, Mt. Jirisan, light trap, 14–15.VIII.1993 (Deokseo Ku), 1 female (SMNE); Gwangyang-si, Okok-myeon, Jangdong-ri, Valley Gunjangijae, light trap, 10–11.VII.2002 (Junseong Sin), 1 female (SMNE).

[JJ] Jeolmul Natural Recreation Forest, San 78-1, Bonggae-dong, Jeju-si, MT-8, 15–30.VI.2024 (Deokseo Ku, Muncheol Kwon), 1 female (SMNE); Seogwipo-si, Daepo-dong, San 2-11, Georin deer Observatory, MT-№ 7, 15–30.IX.2023 (Deokseo Ku, Muncheol Kwon), 1 male (SMNE).

**Host.** Solitary parasitoid of *Apoda limacodes* (Hufnagel), *Austrapoda dentata* (Oberthür); *Heterogenea asella* (Denis & Schiffermüller), *Microleon longipalpis* Butler, *Monema flavescens* (Walker), *Parasa sinica* Moore, *Phrixolepia sericea* Butler, *Scopelodes venosa* Walker (Limaconidae); *Archips rosana* (Linnaeus), *Tortrix testudinana* Hübner (Tortricidae) (Yu *et al.* 2016).

**Distribution.** Korean Peninsula; Belgium, the Netherlands, France, Italy, Germany, Austria, Czech Republic, Bulgaria, Moldova, Ukraine, Armenia, Russia (European part, Far East), Japan.

## Key to Korean species of the genus *Triraphis*

1. Claws of all legs only strongly widened basally, without acuminate basal lobe (Fig. 4I). Body length 3.6–3.8 mm ..... *T. storozhenkoi* sp. nov.
- Claws of all legs with distinctly visible acuminate basal lobe (Figs 2F–H) ..... 2
2. First metasomal tergite narrow, 1.15–1.20 × longer than its posterior width (Fig. 3C). Body mostly black or dark brown, only ventrally partly light brown (Fig. 1C). Body length 3.0–4.2 mm ..... *T. pullus* Papp, 1995
- First metasomal tergite wide, not longer than its posterior width (Figs 3A, B, D, E). Body mostly yellow or light brown, partly sparsely or widely with dark spots (Figs 3A, B, D, E) ..... 3
3. Ovipositor sheath long, 0.40–0.45 × as long as fore wing, 0.7–1.0 × as long as metasoma (Fig. 1D). Body length 4.0–4.4 mm ..... *T. terebrans* Chen & He, 1995
- Ovipositor sheath comparatively short, 0.1–0.2 × as long as fore wing, 0.20–0.25 × as long as metasoma (Figs 1A, B, E) ... 4
4. Body yellow or light brown with many and often wide brown or blackish spots or stripes (Fig. 1E). Body length 2.2–5.5 mm ..... *T. tricolor* (Wesmael, 1838)
- Body entirely yellow to brownish yellow, usually with few small brownish spots (Fig. 1A, B) ..... 5
5. Width of posterior ocellus less than or as long as OOL (Fig. 2B). Length of eye (dorsal view) 2.5–3.5 × length of temple (Fig. 2B). Temple in dorsal view curvedly constricted behind eyes (Fig. 2B). Body length 3.0–4.2 mm ..... *T. flavus* Chen & He, 1997
- Width of posterior ocellus more than OOL (Fig. 2A). Length of eye (dorsal view) 4.0–5.0 × length of temple (Fig. 2A). Temple in dorsal view almost linearly constricted behind eyes (Fig. 2A). Length of body 3.7–4.3 mm ... *T. brevis* Chen & He, 1997

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