

Review of the genus *Syzeuctus* (Hymenoptera, Ichneumonidae, Banchinae) from South Korea

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Abstract

Only two species (*Syzeuctus coreanus* and *S. sambonis*) of the genus *Syzeuctus* were known to inhabit South Korea. In the present study, four species of this genus are newly recorded from South Korea. Among them, two species, *S. albopictus* Kang & Lee, **sp. nov.** and *S. flavofacialis* Kang & Lee, **sp. nov.**, are described as new. Of the other species, the male of *S. takaozanus* was hitherto unknown and is described here, and *S. apicifer* is also new to South Korea. A key to these South Korean species along with the descriptions of the two newly recorded species and digital images are provided.

Keywords

Atrophini, endoparasitoids, ichneumonid wasps, key to species, new record, taxonomy

Introduction

The genus *Syzeuctus* Förster is one of the large genera of the tribe Atrophini, subfamily Banchinae, and comprises 123 species (Yu et al. 2016). Among them, only 14 species inhabit the Eastern Palearctic region, and two species (*Syzeuctus coreanus* Uchida and *S. sambonis* Uchida) were recorded in South Korea. This genus can be distinguished from other genera of the tribe by the following characteristics: frons often with a horn, ridge, or tooth above each antennal socket; genal carina reaching base of mandible; small and triangular areolet with a long stalk. Species of this genus are koinobiont endoparasitoids of Lepidoptera larvae, especially Pyralidae (Yu et al. 2016).

In the present study, we report two species new for science (*Syzeuctus albopictus* Kang & Lee, sp. nov. and *S. flavofacialis* Kang & Lee, sp. nov.) and two species newly recorded from South Korea (*S. apicifer* and *S. takaozanus*). Digital images of the new species and newly recorded species along with a key to the South Korean species of *Syzeuctus* are provided.

Materials and methods

The wasps investigated in this study were collected by sweep net and by Malaise traps and deposited in the Georim Entomological Institute (Daegu, South Korea). Distributional data follow Yu et al. (2016). Abbreviations used in the text are as follows.

GEI	Georim Entomological Institute, Daegu, South Korea	GB	Gyeongsangbuk-do
HU	Hokkaido University, Faculty of Agriculture, Entomological Institute, Sapporo, Japan	GG	Gyeonggi-do
NHMUK	The Natural History Museum, London, United Kingdom	GW	Gangwon-do
CB	Chungcheongbuk-do	GN	Gyeongsangnam-do
CN	Chunagcheongnam-do	JB	Jeollabuk-do
		JN	Jeollanam-do
		TD	Type depository
		TL	Type locality

Specimens were examined using an AxioCam MRC5 camera attached to a stereo microscope (Zeiss SteREO Discovery. V20; Carl Zeiss, Göttingen, Germany), processed using the AxioVision SE64 software (Carl Zeiss), and optimized with a Delta imaging system (i-solution, IMT i-Solution Inc., Vancouver, Canada). Morphological terminology is applied according to the American Entomological Institute website (<http://www.amentinst.org/GIN/morphology.php>).

Taxonomy

Order Hymenoptera

Family Ichneumonidae

Subfamily Banchinae Wesmael, 1845

Genus *Syzeuctus* Förster, 1869

Syzeuctus Foerster, 1869: 167. Type species: *Ichneumon maculatorius* Fabricius.

Diceratops Foerster, 1869: 167. Type species: *Pimpla bicornis* Gravenhorst.

Meyva Cameron, 1899: 19 1. Type species: *Meyva villosa* Cameron.

Rhynchotrevoria Cameron, 1906: 125. Type species: *Rhynchotrevoria rostrata* Cameron.

Ephialtina Szépligeti, 1908: 74. Type species: *Ephialtina apicalis* Szépligeti.

Leptoglyphis Brèthes, 1927: 319. Type species: *Leptoglyphis minasensis* Brèthes.

Paratanera Rao, 1953: 171. Type species: *Paratanera indica* Rao.

Diagnosis. Fore wing 5.0–14.0 mm. Body of moderate proportion to rather slender, the mesosoma usually short. Apex of clypeus in general convex but often truncate or less strongly convex apically. Occipital carina reaching base of mandible. Epomia long and strong. Areolet rather small, triangular with a long stalk, receiving second recurrent vein distad of middle. First tergite rather short, polished with rather sparse to very sparse punctures, moderately tapered toward base. Ovipositor sheath 1.5 to 3.0 times as long as hind tibia (Townes 1970).

Key to the South Korean species of *Syzeuctus*

- 1 Head, mesosoma, and first tergite covered with dense, long, white setae. Face swollen (as in metopiines). Lower ridge of mandible strong, lamelliform **2**
- Body with short setae. Face not swollen. Lower ridge of mandible not lamelliform **3**
- 2 Body length 13–14 mm. Sides of first tergite strongly convergent anteriorly. Face evenly convex. Hind tarsal segments entirely black..... ***S. sambonis***
- Body length about 10 mm. Sides of first tergite very weakly convergent anteriorly. Face with median swelling and two lateral swellings above the clypeal fovea. Hind tarsal segments with white bases and black tips ... ***S. flavofacialis* sp. nov.**
- 3 Malar space more than 1.0 times as long as the basal mandibular width. Fore wing without spots apically..... ***S. albopictus* sp. nov.**
- Malar space less than 1.0 times as long as the basal mandibular width. Fore wing with dark spot apically **4**
- 4 Posterior transverse carina of propodeum complete..... ***S. takaozanus***
- Posterior transverse carina of propodeum absent..... **5**
- 5 The first to fourth tergites entirely red with a pair of brown spot, sometimes each tergite with yellow band anteriorly and posteriorly..... ***S. apicifer***
- First to fourth tergites black with yellow posterior bands ***S. coreanus***

***Syzeuctus albopictus* Kang & Lee, sp. nov.**

<http://zoobank.org/83536F9D-12CA-4C95-BD34-04F625C8DE3A>

Fig. 1

Material examined. *Holotype*, Male, South Korea: [Ulsan] Ulju-gun, Sangbuk-my-eon, Mt. Sinbulsan, 9 Oct. 2006, S. J. Park (GEI) leg.

Description. Male. Body 13.0 mm in length (Fig. 1A), fore wing 8.0 mm in length.

Head in dorsal view with temple narrowed at an angle of more than 45° (Fig. 1C), strongly rounded. Face strongly convex, densely and coarsely punctate, with strong median swelling and two lateral swellings above clypeal fovea. Clypeus convex, with

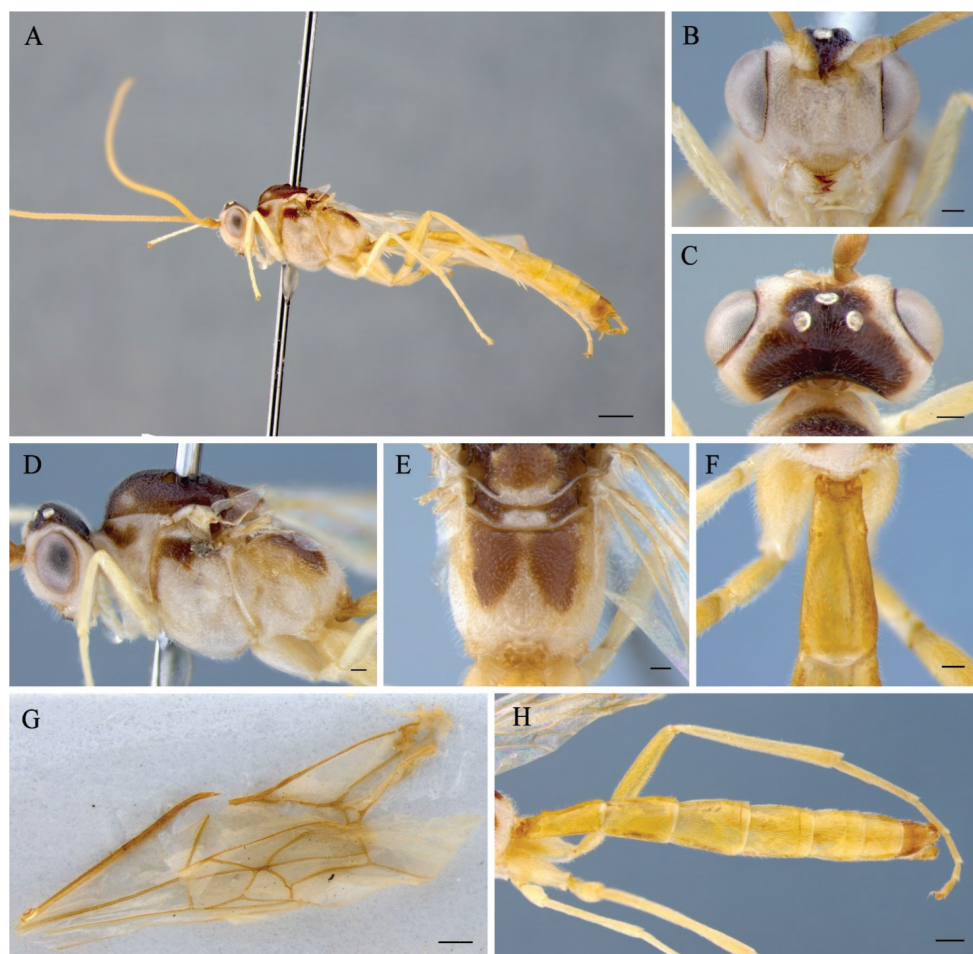


Figure 1. *Syzeuctus albopictus* Kang & Lee, male **A** habitus in lateral view **B** head in frontal view **C** head in dorsal view **D** thorax in lateral view **E** propodeum in dorsal view **F** first tergite in dorsal view **G** wings **H** abdomen in dorsal view. Scale bars: 1.0 mm (**A**), 0.2 mm (**B–F**), 0.5 mm (**G, H**).

long and thin setae; convex apically; clypeal fovea small, open. Mandible slightly tapered, upper tooth slightly longer than lower tooth; lower ridge lamelliform. Maxillary palp with five segments. Frons smooth and concave with small dense punctures. Vertex more sparsely punctate than face. Occipital carina complete, slightly sinuous, joining hypostomal carina at mandibular base. Temple polished and convex with fine punctures. Malar space about 1.3 times as long as basal mandibular width. Inner margin of eye parallel. Antenna filiform with 49 flagellomeres; first flagellomere 3.8 times as long as its width, 1.5 times as long as second flagellomere.

Mesosoma with dense and long setae. Pronotum with fine dense rugoso-punctures. Mesopleuron uniformly punctate except medially where it is polished and impunctate, punctures bigger than those on pronotum; postpectal carina absent. Metapleuron with dense and coarse punctures. Submetapleural carina complete, anterior half very

strongly developed, rectangular. Mesoscutum densely irregularly punctate, notaulus weakly present (Fig. 1D). Scutellum, in profile, strongly convex, densely punctate. Propodeum in dorsal view rather elongate, closely punctate tending to rugose medially, with long and dense setae (Fig. 1E); spiracle of propodeum oval; without posterior transverse carina. Legs slender. Fore tibial spur sinuate. Fore and mid tarsal claws pectinate. Ratio of hind tarsal segments are 5.0:2.5:1.7:1.0:1.3. Hind tarsal claw not pectinate. Hind wing with eight hamuli.

Metasoma elongate with shallow and fine punctures (Fig. 1H). First tergite 2.5 times as long as posterior width, without lateral longitudinal carina (Fig. 1F). Second tergite coriaceous, 1.3 times as long as posterior width.

Color whitish yellow.

Head whitish yellow with brown marks. Mandibular teeth brown (Fig. 1B). Frons and vertex with brown mark around ocellar triangle. Antenna yellow. Mesoscutum brown with triangular whitish yellow spot on its anterior on both sides. Scutellum yellowish brown. Postscutellum whitish yellow. Anterior margin of pronotum dorsally with brown mark. Mesopleuron with yellowish brown mark. Propodeum in dorsal view with elongate brown mark on each side of its anterior part (Fig. 1E). Legs entirely whitish yellow. Hind tarsal claw bright brown. Wings hyaline (Fig. 1G). Metasoma whitish yellow with yellowish brown coloration posteriorly (Fig. 1H).

Female. Unknown.

Distribution. South Korea (new record).

Remark. This species is easily distinguished by its very bright body color and very long malar space, 1.3 times the basal mandibular width.

Syzeuctus apicifer (Walker, 1874)

Fig. 2A

Macrus apicifer Walker, 1874: 305. Type: ♀, TL: Japan, TD: NHMUK.

Diagnosis. Female. Face convex, densely and coarsely punctate. Clypeus truncate apically. Temple polished and convex, with fine punctures. Malar space about 0.7 times as long as basal mandibular width. Antenna filiform with 43 flagellomeres; first flagellomere 1.8 times as long as second flagellomere. Mesosoma stout with dense pubescence. Epicnemium with a developed lamelliform projection apically. Propodeum in dorsal view stout; closely punctate tending to rugose, partly with dense setae; without posterior transverse carina. Fore and mid tarsal claws pectinate. Ratio of hind tarsal segments are 4.5: 2.5: 1.6: 0.8: 1.0; hind tarsal claw simple. Hind wing with eight hamuli. First tergite rectangular, 2.5 times as long as posterior width, without lateral longitudinal carina. Second tergite coriaceous, 1.5 times as long as posterior width. Ovipositor sheath with dense, short setae; approximately as long as metasoma.

Color. Black with brownish metasoma. Frontal orbit yellow, interrupted medially. Clypeus and mandible yellow with black mandibular teeth. Genal orbit yellow. Malar space yellow apically. Antenna brown with black scape and pedicel. Mesoscutum black

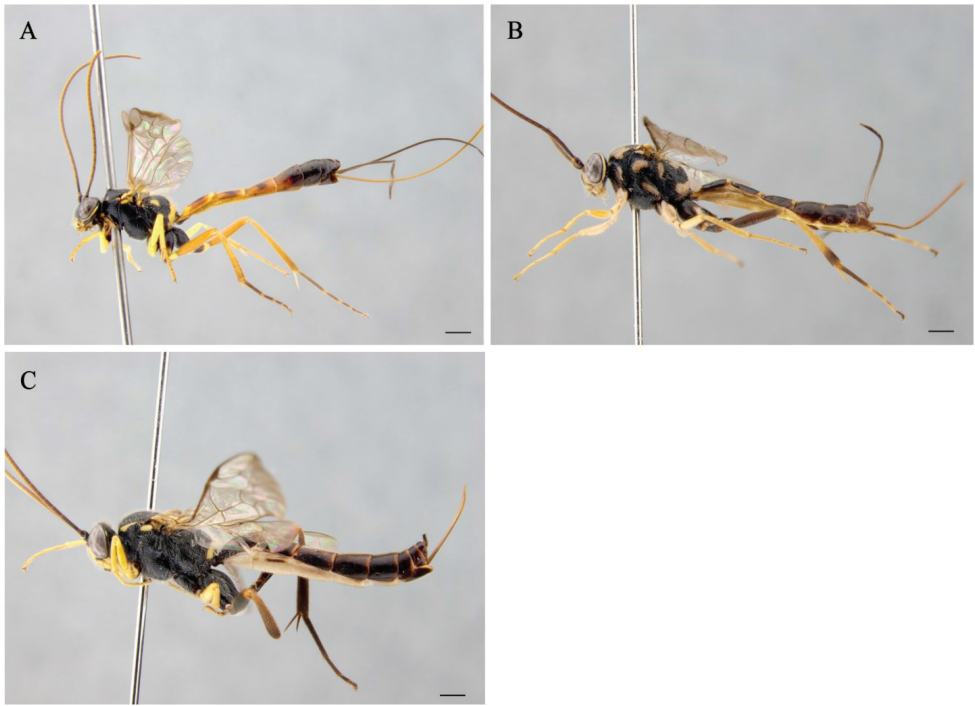


Figure 2. Habitus in lateral view **A** *Syzeuctus apicifer* (Walker) **B** *S. coreanus* Uchida **C** *S. sambonis* Uchida. Scale bars: 1.0 mm.

with a small anterior triangular yellow spot on each side. Scutellum yellow except black triangular spot anteriorly. Tegula yellow. Mesopleuron black with small yellow mark just below tegula. Upper projection of mesepimeron yellow. Propodeum in dorsal view with small yellow spot on each side of anterior part; strongly pointed triangular mark posteriorly. Fore wing with brown spot apically. Fore and mid legs entirely yellow with brown tarsal claw. Hind coxa and trochanter black with brown apically; trochantellus yellow; femur yellowish brown; tarsus and tarsal claw tan brown. Metasoma brown with black posteriorly. First tergite with yellow anteriorly and posteriorly.

Male. Male has more yellow spots; face, pronotum with longitudinal mark anteriorly and upper and posterior corner, mesopleuron with a longitudinal mark, posterior half of metapleuron. The color of genal orbit, mesoscutum, scutellum, propodeum are same with female. First and Second tergite black with yellow anteriorly and posteriorly. Third and fourth tergites brown with yellow posteriorly. Fore wing a bit infuscate apically, without spot.

Material examined. South Korea: 1♀, [CN] Sijang-ri, Ibjang-myeon, 10 Sep. 2010, H. S. Lee leg.; 1♀, [GB] Cheongdo-gun Gakbuk-myeon Namsan-ri, 20 Jun. 2007, J. W. Lee leg.; 2♀♀, ditto, 27 Jul. – 14 Aug. 2008, J. W. Lee leg.; 1♀, ditto, 23 Aug. 2008, J. W. Lee leg.; 1♀, ditto, 25 Jun.–8 Jul. 2012, J. W. Lee leg.; 2♀♀,

ditto, 2 Sep.–18 Nov. 2012, J. W. Lee leg.; 1♀, [GB] Cheongdo-gun Maejeon-myeon Mt. Seonuisan, 21 Sep. 2008; 1♂, [GB] Cheonmunsa, 1 Jul. 1981, S. S. Kim leg.; 1♀, [GB] Goryang-gun Osilnaru, 6 Sep. 1997, J. W. Lee leg.; 1♂, [GB] Gunwi-si Bugye-myeon Dongsan-ri San75 Odoam, 17 Aug. 2015, J. W. Lee leg.; 1♂, [GB] Gyeongju-si Sinwon2-gyo, 17 Jun. 2016, J. W. Lee leg.; 1♀1♂, [GB] Gyeongsan-si Apriyang-myeon Sinwol, 21 Jun. 1986, J. M. Choi leg.; 1♀, [GB] Gyeongsan-si Daehak-ro 280 Yeungnam Univ., 27 Jun. 1986, M. L. No leg.; 12♀♀, ditto, 3 Jul. 1986, J. W. Lee leg.; 3♀♀, ditto, 10 Jul. 1986, J. W. Lee leg.; 3♀♀1♂, ditto, 8 Sep. 1986, J. W. Lee leg.; 1♂, ditto, 9 Sep. 1986, J. W. Lee leg.; 2♀♀1♂, ditto, 14 Oct. 1986, J. W. Lee leg.; 1♂, ditto, 29 Jun. 1987, J. W. Lee leg.; 2♀♀, ditto, 3 Jul. 1987, J. W. Lee leg.; 1♂, ditto, 6 Jul. 1987, J. W. Lee leg.; 1♀2♂♂, ditto, 8 Nov. 1987, J. W. Lee; 1♀, ditto, 18 Sep. 1987, J. W. Lee leg.; 1♀, ditto, 26 Aug. 1988, K. I. Suh leg.; 1♂, ditto, 27 Aug. 1988, J. W. Cha leg.; 1♀1♂, ditto, 30 Aug. 1988, J. Y. Cha leg.; 1♀, ditto, 31 Aug. 1988; 2♂, ditto, 1 Sep. 1988, J. W. Lee leg.; 2♀♀3♂♂, ditto, J. W. Lee leg.; 3♀♀1♂, ditto, 3 Sep. 1988, E. S. Kim leg.; 2♂♂, ditto, 7 Sep. 1988; 1♂, 3 Jul. 1989, J. G. Kim leg.; 1♀, ditto, 5 Aug. 1989; 2♀, ditto, 5 Sep. 1989; 1♂, ditto, 6 Sep. 1989; 1♀, ditto, 20 Jun. 1992, S. M. Lee leg.; 1♀, ditto, 20 Jun. 2008, Y. S. Choi leg.; 1♂, ditto, 13 Jul. 2008; 1♀, ditto, 8 Jul. 2008; 1♀, ditto, 28 Aug. 2008, J. Chen leg.; 1♀, ditto, 20 Sep.–3 Oct. 2015, J. W. Lee leg.; 1♂, [GB] Gyeongsan-si Namcheon-myeon Hado-ri Hadojeosiji, 18 Jun. 2016, J. W. Lee leg.; 3♀♀1♂, [GB] Gyeongsan-si Nammaeji, 7 Jul. 1986, J. Y. Cha leg.; 1♂, [GB] Mt. Baekamsan Subi, 10 Jul. 1999; 1♂, [GB] Mt. Hakgasan, 6 Sep. 1998; 1♀1♂, [GB] Mt. Sonamsan, 5 Sep. 1998, S. J. Suh leg.; 2♀♀, [GB] Sangju-si Gongseong-myeon, 18 Jul. 2007, S. K. Lee leg.; 1♀, [GB] Yeongju-si Bonghyeon-myeon Mt. Sobaeksan Ongnyeobong, 27 Jul. 2003; 1♀, [GG] Gwangcheon-ri, 23 Apr. 1984, J. W. Lee leg.; 1♂, [GN] Jinju-si Gajwa-dong, 29 Jul. 1989, J. S. Park leg.; 1♀, [GW] Goseong-gun Ganseong-eup Tapdong-ri Scheonsa, 10 Sep. 2008, H. S. Lee, S. W. Suk, & J. S. Lim leg.; 1♀, [GW] Hoengseong-gun Gapcheon-myeon Hadae-ri Holocene, 8–14 Jul. 2009, J. W. Lee leg.; 1♀, [GW] Hongcheon-gun Bukbangmyeon Seongdong-ri Jayeonhwangyeongyeongu park, 1419 Sep. 2011; 1♀, [GW] Wonju-si Heungeop-myeon Maeji-ri Yonsei Univ. Wonju Campus, 16 Aug.–16 Oct. 2008, H. Y. Han leg.; 1♀, ditto, 523 Sep. 2008, H. Y. Han leg.; 1♀, ditto, 16 Aug.–16 Oct. 2009, H. Y. Han leg.; 1♀5♂♂, ditto, 29 Jun.–15 Jul. 2011, H. Y. Han leg.; 1♀, ditto, 1 Jun.–30 Jul. 2012, H. Y. Han leg.; 1♀, ditto, 20 Jun.–30 Jul. 2013, H. Y. Han leg.; 1♀, ditto, 523 Sep. 2015, H. Y. Han leg.; 1♂, ditto, 17 Jul.–5 Sep. 2015, H. Y. Han leg.; 1♂, [JB] Jinan-gun Baegun-myeon Nochon-ri, 10 Jul. 2013, S. H. Oh leg.; 1♀1♂, [JB] Mt. Unjangsan, 5 Sep. 1998; 1♀, [JB] Wanju-gun Dongsang-myeon Daea Arboretum, 1630 Jun. 2012, J. M. Park leg.; 1♀, [JJ] Noruoreum, 26 Jun. 2003; 1♀1♂, [Daegu] Dalseo-gu Daegok-dong Daegu Arboretum, 20 Jun.–4 Jul. 2012, S. G. Kang leg.; 1♂, [Seoul] Noweon-gu Sanggye4-dong Mt. Suraksan, 18 Jul.–24 Aug. 2007, J. O. Lim leg. China: 1♂, Jirin, Yanbian Hunchun, 21 Jul. 2010, J. W. Lee leg.

Distribution. South Korea (new record), China (Sichuan), Japan.

***Syzeuctus coreanus* Uchida, 1928**

Fig. 2B

Syzeuctus coreanus Uchida, 1928: 93. Lectotype: ♀, TL: Korea, TD: HU.

Diagnosis. Body with short setae. Face not swollen. Malar space less than 1.0 times as long as the basal mandibular width. Antenna with 44 flagellomeres; first flagellomere 1.8 times as long as second flagellomere. Propodeum in dorsal view with yellow spot on each side of anterior part; strongly pointed triangular mark in posteriorly; posterior transverse carina absent. Ratio of hind tarsal segments are 5.0: 2.5: 1.5: 0.8: 1.0. Fore wing with dark spot apically. First to fourth tergites with thin yellow apically.

Material examined. South Korea: 1♀, [CB] Danyang-gun Cheondong-ri Mt. Sobaeksan, 2 Aug. 1994, J. I. Kim leg.; 1♀, ditto, 2 Aug.–14 Sep. 2005; 1♀, ditto, 28 Jul.–13 Aug. 2006; 1♀, ditto, 25 Jun.–9 Aug. 2007; 1♀, [CB] Mt. Sobaeksan Chondonggyegok, 22 May 1997, J. W. Lee leg.; 1♂, [CN] Gyeryong-si Sindooan-myeon Bunam-ri Mt. Gyeryongsan Donghaksa upper, 14 Mar.–28 Aug. 2012, J. C. Jeong leg.; 1♀, [Daejeon] Seopgu Wolpyeong Park, 20 Jun.–10 Aug. 2008; 2♂♂, [GB] Cheongdo-gun Unmun-myeon Haksodaepokpo, 2228 Jun. 2014, J. W. Lee leg.; 1♀, [GB] Yeongcheon-si Sinyeong-myeon Chisan-ri San 141-4, 15 Jul.–29 Aug. 2014, J. W. Lee leg.; 1♀, [GG] Gapyeong Cheongpyeong Goseong Mt. Homyeongsan, 16–30 Jul. 2009, J. O. Lim leg.; 1♀, ditto, 31 Jul.–17 Aug. 2009, J. O. Lim leg.; 1♀, [GG] Yangpyeong Yongmun Yeonsu Mt. Youngmunsan, 31 Jul.–17 Aug. 2009, J. O. Lim leg.; 1♀, [GN] Changyeong-gun Yueo-myeon Daedae-ri Uponeup, 5 May 2015, J. W. Lee leg.; 1♀, [GN] Mt. Sokrisan, 23 May 1981; 1♀, [GN] Yeongju-si Punggi-eup Jungyeong, 12 Jun.–23 Jul. 2008, J. M. Kwon leg.; 1♀, [GW] Donghaesi Samhwadong Mureung valley, 917 Aug. 2005; 1♀, [GW] Wonju-si Gwira-myeon from Cheoneunsa Temple to Sibjabong, 5 May 2005, H. W. Kim & S. R. Lee leg.; 1♀, [JB] Namwon-si Sannae-myeon Mt. Jinisan Baemsagol, 11 Jun.–7 Jul. 2001, J. W. Lee leg.; 1♀, [JN] Choeung-gun Yeongnam-myeon Paryeong-ro Geumsa-ri Mt. Paryeongsan Forest Resort, 13 Apr. 2012; 1♂, [JN] Gurye-gun Sandong-myeon Simwon, 30 Jul. 1992; 1♀, [JN] Jeongeup-si Jangseong-gun Buka-myeon Sajabong, 31 Aug. 2005; 1♀, [JN] Mt. Jirisan, 15 Jul. 1979, S. H. Jeong leg.

Distribution. South Korea, China (Qinghai), Japan.

***Syzeuctus flavofacialis* Kang & Lee, sp. nov.**

<http://zoobank.org/C927F7B7-455B-46F9-BE8A-BEC0773D1CED>

Fig. 3

Description. Female. Body 10.0 mm in length. Fore wing 7.0 mm in length (Fig. 3A).

Head in dorsal view flat with temple narrowed at an angle of more than 45°, round (Fig. 3C). Face convex, densely and coarsely punctate; with median swelling and two lateral swellings above clypeal fovea (Fig. 3B). Clypeus flat, with long and strong setae;

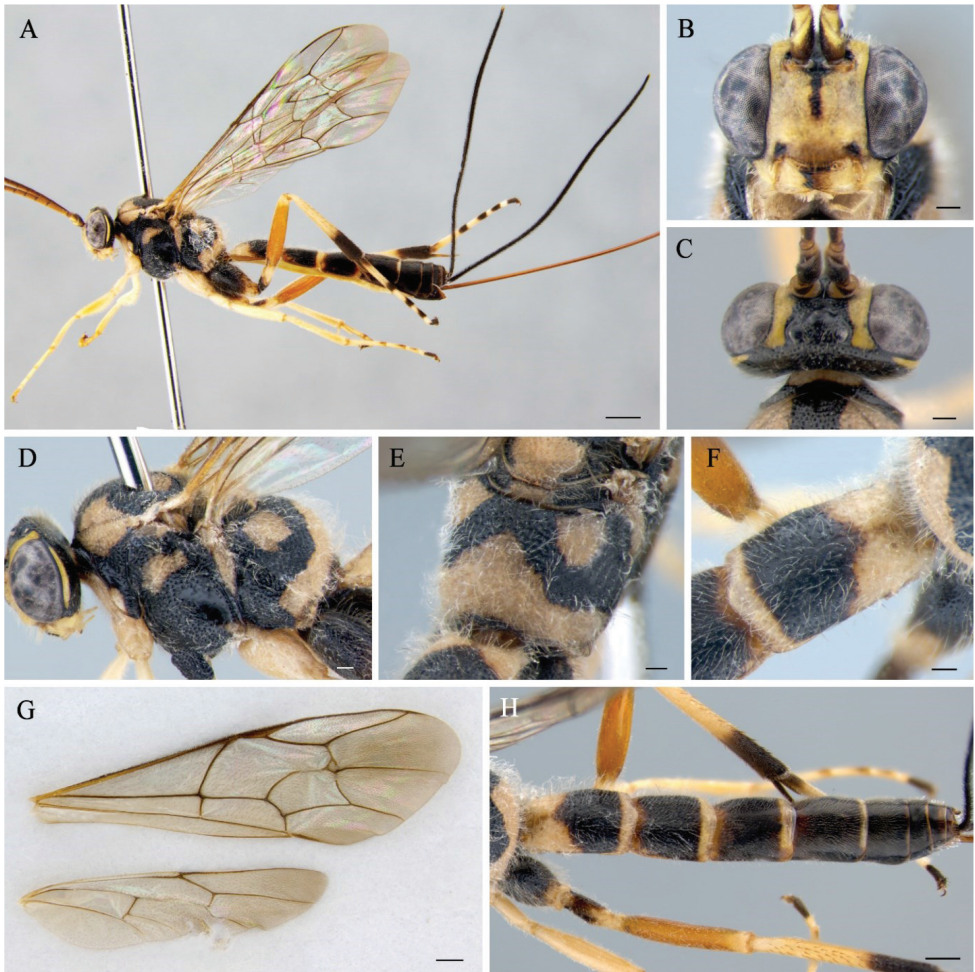


Figure 3. *Syzeuctus flavofacialis* Kang & Lee, female **A** habitus in lateral view **B** head in frontal view **C** head in dorsal view **D** thorax in lateral view **E** propodeum in dorsal view **F** first tergite in dorsal view **G** wings (left) **H** abdomen in dorsal view. Scale bars: 1.0 mm (**A**), 0.2 mm (**B–F**), 0.5 mm (**G, H**).

apically truncate; clypeal fovea open. Mandible moderately stout, strongly tapered, upper tooth slightly longer than lower tooth; lower ridge strongly developed, lamelliform. Maxillary palp with five segments. Frons smooth, convex, with small dense punctures. Vertex more sparsely punctate than face. Occipital carina complete, slightly sinuous, joining hypostomal carina at mandibular base. Temple polished and convex, with fine punctures. Malar space about 0.5 times as long as basal mandibular width. Inner margins of eyes parallel. Antenna filiform with 42 flagellomeres; first flagellomere 4.5 times as long as its width, 1.6 times as long as second flagellomere.

Mesosoma with dense and long setae. Pronotum with rugoso-punctures; upper posterior margin hook-shaped. Mesopleuron with epicnemial carina laterally, uniformly punctate except medially where it is polished and impunctate; punctures bigger

than those on pronotum; postpectal carina absent. Metapleuron with dense and coarse punctures. Submetapleural carina complete, anterior half strongly developed. Mesoscutum irregularly densely punctate, notaulus absent. Scutellum, in profile, slightly convex, densely punctate. Propodeum in dorsal view very stout, closely punctate towards rugose, partly with long and dense setae (Fig. 3E); spiracle of propodeum oval; without posterior transverse carina. Legs slender. Fore tibial spur sinuate. Fore and mid tarsal claws pectinate. Ratio of hind tarsal segments 2.5:1.4:1.0:0.5:0.6; hind tarsal claw not pectinate. Hind wing with eight hamuli.

Metasoma depressed with shallow and dense punctures (Fig. 3H). First tergite rectangular, 1.8 times as long as posterior width, without lateral longitudinal carina (Fig. 3F). Second tergite coriaceous, 1.2 times as long as posterior width. Ovipositor sheath with dense, short setae, 1.6 times as long as metasoma, 4.0 times as long as hind tibia.

Color black with yellow marks.

Head black. Face yellow with black median longitudinal mark (Fig. 3B); area around clypeal fovea black. Mandibular teeth black. Frontal orbit and genal orbit broadly yellow. Malar space yellow. Antenna brown; scape black with brown ventrally; pedicel yellow. Mesosoma black with yellow marks (Fig. 3D). Mesoscutum black with anterior triangular yellow spot on each side; medially with big yellow spot. Scutellum entirely yellow. Upper margin of pronotum broadly yellow; lower anterior margin with yellow spot. Tegula yellow. Mesopleuron black with yellow upper margin and lower posterior margin, slightly above middle with short yellow short boomerang-shaped mark. Propodeum in dorsal view with yellow spot on each side of anterior part; triangular yellow mark posteriorly (Fig. 3E). Fore and mid legs bright yellow with brown apex of mid tarsus and tarsal claw. Hind coxa and trochanter black; trochantellus yellow; femur bright brown; all tarsal segments yellow with black each apically; tarsal claw black. Wings weakly infusate (Fig. 3G). Metasoma black. First tergite black with yellow anterior third; first to fourth tergites each with a posterior yellow line (Fig. 3H).

Material examined. Holotype. ♀, South Korea, [GW] Wonju-si Heungeop-myeon Maeji-ri Yensei Univ., 18 Jul.–4 Sep. 2015, H. Y. Han (GEI) leg. **Paratypes** (GEI). South Korea: 1♀, [CB] Cheongwon-gun Miwon-myeon Miwon-ri, 2229 Jul. 2005, J. H. Han leg.; 1♀, [CB] Sobaeksan Danyang-gun Danyang-eup, 25 Jun.–9 Aug. 2007; 1♀, [CN] Mt. Deoksungsan Sudeoksa, 11 Aug. 1983, J. W. Lee leg.; 1♀, [Daejeon] Dong-gu Daejeon Univ., 15 Aug.–30 Sep. 2006, J. W. Lee leg.; 1♀, [Daejeon] Seogu Wolpyeong-dong Wolpyeon park, 20 Jun.–10 Aug. 2008; 1♀, [GB] Yeoncheon-si Cheongtong-myeon Temp. Eunhaesa, 21 Jul.–10 Aug. 2015, J. W. Lee leg.; 1♀, [GB] Yeonju-si Dansan-myeon Jwaseok-ri Mt. Sobaeksan Yeonhwa 2 bridge, 6 Aug.–8 Sep. 2016, Y. J. Kim leg.; 2♂, [GG] Annyang-si Manan-gu Gwanaksan, 519 Jul. 2007, J. O. Lim leg.; 2♀♀, [GG] Anyang-si Kwanak, 26 Jul.–7 Aug. 2008; 1♀, [GG] Goyang-si Deog-yang-gu Goyang-dong, 24 Aug.–6 Sep. 2007, J. O. Lim leg.; 1♀, [GW] Donghae-si Samhwa-dong Mureung valley, 15 Jul.–1 Aug. 2005; 1♀, [GW] Wonju-si Heungeop-myeon Maeji-ri Yensei Univ., 11 Aug.–8 Sep. 2007, H. Y. Han leg.; 1♀, ditto, 31 Jul.–5 Sep. 2014, H. Y. Han leg.; 1♀, ditto, 18 Jul.–4 Sep. 2015, H. Y. Han leg.; 1♀, [Incheon] Ongin-gun Daechong-myeon daechongri [natural habitat

of *Camellia japonica*] Daechongdo, 9 Aug. 2017, J. W. Lee leg.; 1♀, [JB] Buan-gun Jinseo-myeon Unho-ri San1-1, 7 Jul.–18 Aug. 2016, E. J. Hong leg.; 2♀♀, [Seoul] Noweon-gu Sanggye4-dong Mt. Suraksan, 18 Jul.–24 Aug. 2007, J. O. Lim leg.

Distribution. South Korea (new record).

Remark. This species is similar to *S. sambonis* in that its face is convex, but unlike *S. sambonis*, which has a face that is convex overall, *S. flavofacialis* has median and lateral swellings.

Syzeuctus sambonis Uchida, 1928

Fig. 2C

Syzeuctus sambonis Uchida, 1928: 94. Type: ♂, TL: Japan, TD: HU.

Diagnosis. Body entirely covered with dense, long, white setae. Face swollen medially with two lateral swelling above clypeal fovea. Malar space about 0.3 times as long as basal mandibular width. Lower ridge of mandible strong, lamelliform. Posterior transvers carina of propodeum present. Pleural carina present. Ratio of hind tarsal segments are 2.5:1.2:1.0:0.3:0.5. Sides of first tergite strongly convergent anteriorly. Hind tarsal segments entirely black.

Material examined. South Korea: 1♂, [CB] Cheongju-si Chungbuk National Univ., 19 Jul. 2003, G. H. Park & O. B. Kwon leg.; 1♀, [CB] Cheongwon-gun Miwon-myeon Miwon-ri, 22–29 Jul. 2005, J. H. Han leg.; 1♀, [CN] Onyang, 19 Jun. 1983, J. W. Lee leg.; 2♀♀, [CN] Seosan-si Haemi-myeon Daegok-ri Hanseo Univ., 11 Jun.–8 Jul. 2011, J. W. Lee leg.; 1♀, [GB] Bonghwa-gun Myeongho-myeon Mt. Cheongyangsan, 5 May 2000, J. W. Lee leg.; 1♀, [GB] Gyeongju-si Hyeongok-myeon Namsa-ri, 30 Jun.–14 Jul. 2005, J. T. Mun leg.; 1♀, ditto, 28 Jul.–11 Aug. 2005, J. T. Mun leg.; 1♀, ditto, 1825 Aug. 2005, J. T. Mun leg.; 1♀, [GG] Ongjin Mungapdo, 4 Aug. 1982, J. I. Kim leg.; 1♀, [GM] Mt. Jirisan Jangdan, 2124 Jul. 1975; 1♀, [Incheon] Nam-gu Jamsu-dong, 5 Jul. 1986, H. M. Park leg..

Distribution. South Korea, China (Henan, Shandong), Japan.

Syzeuctus takaozanus Uchida, 1928

Fig. 4

Syzeuctus takaozanus Uchida, 1928: 95. Lectotype: ♀, TL: Japan, TD: HU.

Description. Male. Body 13.0 mm in length. Fore wing 8.0 mm in length (Fig. 4A).

Head in dorsal view flat with temple narrowed at an angle of about 45°, round (Fig. 4C). Face convex, densely and coarsely punctate, without swelling. Clypeus flat, with long and thin setae, apically convex (Fig. 4B); clypeal fovea open. Mandible moderately stout, strongly tapered, upper tooth slightly longer than lower tooth; lower ridge

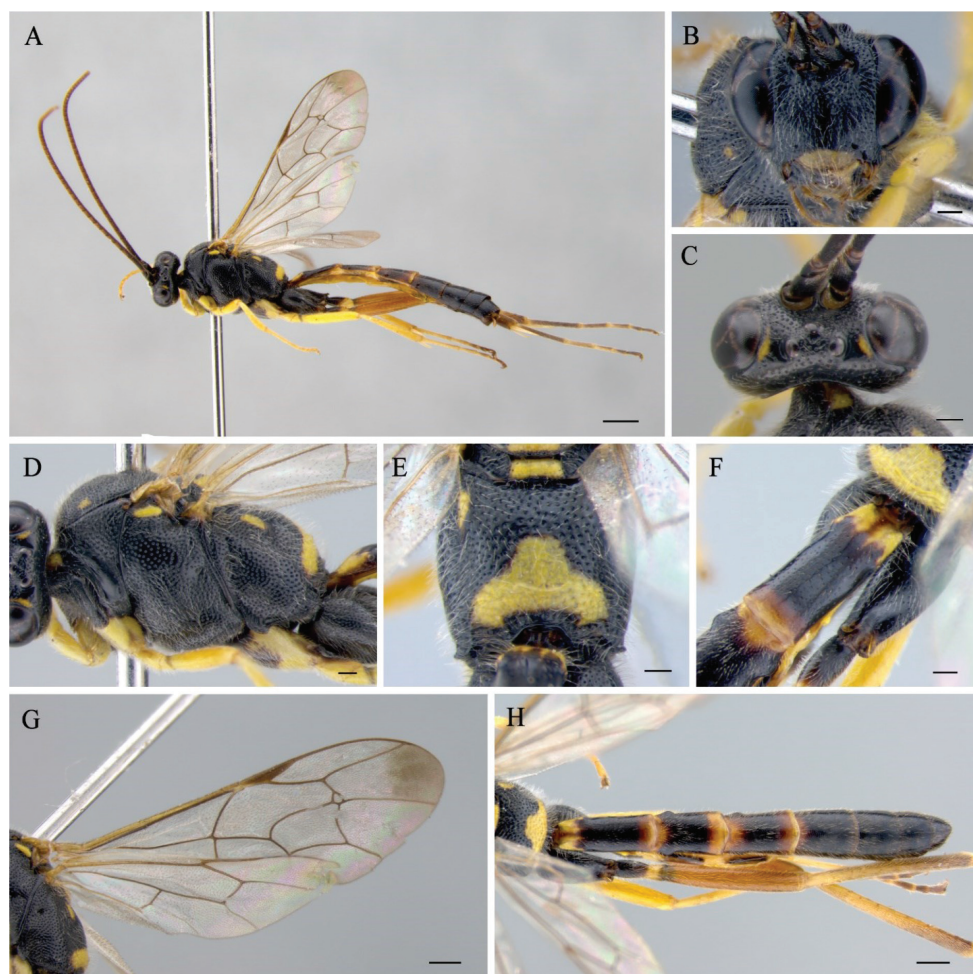


Figure 4. *Syzeuctus takaozanus* Uchida, male **A** habitus in lateral view **B** head in frontal view **C** head in dorsal view **D** thorax in lateral view **E** propodeum in dorsal view **F** first tergite in dorsal view **G** wings (left) **H** abdomen in dorsal view. Scale bars: 1.0 mm (**A**), 0.2 mm (**B–F**), 0.5 mm (**G, H**).

not developed. Maxillary palp with five segments. Frons smooth and convex with dense punctures. Vertex more sparsely and finely punctate than face. Occipital carina complete, slightly sinuous, joining hypostomal carina at mandibular base. Temple polished and convex with fine punctures. Malar space about 0.6 times as long as basal mandibular width. Inner margin of eye parallel. Antenna filiform with 42 flagellomeres; first flagellomere 3.0 times as long as its width, 2.0 times as long as second flagellomere.

Mesosoma with dense and short setae (Fig. 4D). Pronotum with punctures entirely, not fused; upper posterior margin hook-shaped. Mesopleuron with epicnemial carina reaching medially; uniformly punctate, except medially where it is polished and impunctate; punctures bigger than on pronotum; postpectal carina absent. Metapleuron with dense punctures. Submetapleural carina complete, anterior half strongly de-

veloped. Mesoscutum polished, irregularly densely punctate, notaulus absent. Scutellum, in profile, slightly convex, densely punctate. Propodeum in dorsal view stout; closely punctate with long and dense setae; only posterior transverse carina completely developed; spiracle of propodeum oval. Legs slender. Fore tibial spur sinuate. Fore and mid tarsal claws pectinate. Ratio of hind tarsal segments 4.8:2.5:1.7:1.0:1.3; hind tarsal claw simple. Hind wing with seven hamuli.

Metasoma elongate with shallow and dense punctures (Fig. 4H). First tergite 3.1 times as long as posterior width (Fig. 4F), without lateral longitudinal carina. Second tergite coriaceous, 1.6 times as long as posterior width.

Color black with yellow marks.

Head black. Clypeus yellow. Frontal orbit with yellow spot. Genal orbit medially yellow. Antenna brown with black scape and pedicel. Tegula yellow. Upper margin of mesopleuron with yellow longitudinal mark. Mesoscutum with small anterior yellow spot on each side. Scutellum yellow, except black triangular mark anteriorly. Propodeum, in dorsal view, with small yellow spot on each side of anterior part; ▤-shaped yellow mark posteriorly (Fig. 4E). Fore wing infusate apically (without any spots) (Fig. 4G). Fore leg yellow with brown tarsal claw. Mid leg yellow with black coxa ventrally and tarsal claw. Hind coxa and trochanter black; trochantellus yellow; femur brown; tibia and tarsus yellow with black apically; tarsal claw black.

Material examined. South Korea: 1♀, [CN] Daejeon Dong-gu yongundong Daejeon Univ., 18 May–14 Jun. 2007, J. W. Lee leg.; 1♀, [GB] Gyeongsansi Daedong Yeungnam Univ., 1125 Jun. 2009, J. W. Lee leg.; 1♀, [GG] An-yang-si Man-an-gu Kwan-ag [Arb], 924 Jun. 2007, J. O. Lim leg.. China: 1♂, Jirin, Yanbian Hunchun, 21 Jul. 2010, J. W. Lee leg.

Distribution. South Korea (new record), China (Henan, Liaoning), Japan.

Remarks. The male specimen is newly described based on the Chinese specimen. *Syzeuctus takaozanus* and *S. sambonis* are similar because of the entirely black body, and easily distinguished from other *Syzeuctus* by the complete posterior transverse carina of the propodeum (Sheng et al. 2013; Uchida 1928). These two species are easily distinguished from each other by the color of the face: female *S. takaozanus* has an entirely black face, while *S. sambonis* has a yellow face with a black spot (Sheng et al. 2013). Furthermore, these two species differs by the presence (*S. sambonis*) or absence (*S. takaozanus*) of the pleural carina. By these characters, females and males of *S. takaozanus* are easily associated. Unlike the male, the female of *S. takaozanus* has an entirely black body and weakly infusate wings apically.

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