

ORIGINAL ARTICLE

Taxonomic notes on the genus *Holepyris* (Hymenoptera: Bethyridae) from Korea with descriptions of six new speciesJongok LIM¹, Mamoru TERAYAMA², Sangchul SHIN³ and Seunghwan LEE¹

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Abstract

Six new species of the genus *Holepyris* (Hymenoptera: Bethyridae: Epyrinae) from Korea are described: *H. brevicarinatus* sp. nov., *H. crinitus* sp. nov., *H. dimidiatus* sp. nov., *H. longicephalus* sp. nov., *H. mucro* sp. nov. and *H. multo* sp. nov. They are described with illustrations of male genitalia and the biometric measurement data. A key to the Korean species of *Holepyris* based on males is provided.

Key words: biometric measurement data, ectoparasitoid, Epyrinae, male genitalia.

INTRODUCTION

The genus *Holepyris* Kieffer 1904 of the subfamily Epyrinae (Hymenoptera: Bethyridae) is most sharply characterized in the subfamily Epyrinae by “slender mandibles with one to five (usually two) apical teeth, strongly trilobated clypeus with the lateral lobes usually wider than the median one, compound eyes with long erect hairs (short or absent in some species), pronotum much longer than mesoscutum with a transverse carina margining the disc anteriorly, very thin, subparallel, and usually incomplete notaulus, scutellum with a transverse groove at base, small and narrow pterostigma, long radial vein with basal vein reaching the base of pterostigma and subquadrate propodeal disc” (Evans 1964, 1977).

Ecologically, the *Holepyris* species are usually found on or close to the ground or under the bark of trees. They have been known as the ectoparasitoid of Cerambycidae, Cucujidae, Curculionidae, Silvanidae, Tenebrionidae, Tortricidae, and Pyralidae in concealed situations (Bridwell 1919; Evans 1978; Gahan 1930; Gordh & Móczár 1990; Muesebeck & Walkley 1951).

There are 120 species of *Holepyris* known around the world, of which 25 species are recorded from the Oriental and the Southeastern Palaearctic regions (Evans 1977; Gordh & Móczár 1990; Gobbi & Azevedo 2006; Terayama 1993, 1999, 2006; Xu *et al.* 2003).

In South Korea, Bethyridae have not been studied well, and the genus *Holepyris* has not been reported until now (Lim *et al.* 2006, 2007; Terayama 1993)

Examining the *Holepyris* specimens from Korea, we describe six new species with the illustrations of male genitalia and the biometric measurement data for each species.

MATERIALS AND METHODS

All materials examined in this paper were collected from 2005 to 2007 by Malaise traps nationwide in Korea. The abbreviations for collection localities are as follows: GG, Gyeonggi-do; GW, Gangwon-do; CB, Chungcheongbuk-do; CN, Chungcheongnam-do; JB, Jeonlabuk-do; JN, Jeonlanam-do; GB, Gyeongsangbuk-do; GN, Gyeongsangnam-do; JJ, Jeju-do; FERI, Forest Environment Research Institute, Seoul.

The terms of integument sculpture follows Harris (1979) and the following abbreviations in the descriptions and measurements are adopted from Evans (1964, 1978) and Terayama (2006): TL, total length; LH, length of head excluding mandibles; WH, width of head; WF, width of frons; LE, length of compound eye in

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lateral view; DAO, diameter of anterior ocellus; WOT, width of ocellar triangle; POL, posterior ocellar line; AOL, antero-posterior ocellar line; OOL, ocello-ocular line; LPD, length of propodeal disc (measured from anterior margin to transverse carina, if transverse carina present, from anterior margin to posterior part which connect with metasoma (if transverse absent); WPD, width of propodeal disc; LFW, length of forewing; LM, length of mesosoma; LP, length of pronotum excluding anterior ocellar; WP, width of pronotum, LAntI–V and XIII, length of scape, pedicel, flagellomere I–III and XI; WAntI–V and XIII, width of scape, pedicel, flagellomere I–III and XI.

All specimens examined in this study, including the types, are deposited in the Insect Collection, College of Agriculture and Life Science, Seoul National University (SNU CALS).

SYSTEMATIC ACCOUNTS

Family Bethyilidae

Subfamily Epyrinae

Tribe Epyrini

Genus *Holepyris* Kieffer 1904

Holepyris Kieffer 1904. Ann. Mus. Civ. Stor. Nat. Genova, 41: 390.

Rysepyris Kieffer 1906. In André, Spec. Hymén. Eur. Algér., 9: 341.

Misepyrus Kieffer 1913. Boll. Lab. Zool. Portici, 7: 108.

Parepyris Brèthes 1913. Ann. Mus. Nat. Hist. Nat. Buenos Aires, 24: 87.

Holepyris brevicarinatus Lim and Lee sp. nov.

(Figs 1–9, Table 1)

Description

Male (Holotype).

Colour

Head black except mandible and tip of clypeus brown; antenna black except tip of pedicel dark brown.

Mesosoma black; forewing hyaline, wing veins testaceous (Fig. 7); legs brown except coxae and femora black.

Metasoma black.

Morphology

Body (Fig. 1) 5.45 mm long with numerous micropogons.

Head (Figs 2–4): 1.0X as long as wide with convex posterior margin in full face view, dorso-lateral corner round; frons and vertex with irregular shallow punctures, each puncture apart by about 2.0 or 3.0X as wide as their diameter; mandible slender with an apical tooth;

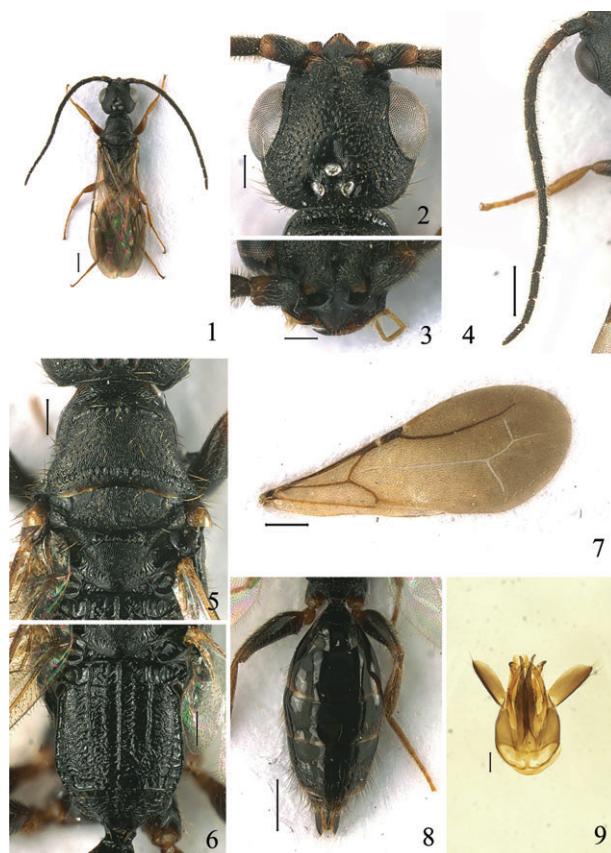


Figure 1–9 *Holepyris brevicarinatus* sp. nov. (Male) 1 Whole body. 2 Head. 3 Clypeus. 4 Antenna. 5 Pronotum and mesonotum (dorsal view). 6 Propodeum. 7 Right forewing. 8 Metasoma (dorsal view). 9 Genitalia (dorsal view) (Scale bars: 9: 0.10 mm; 2, 3, 5, 6: 0.20 mm; 1, 4, 7, 8: 0.50 mm).

clypeus short, median lobe round, inner half of lateral lobes truncated anteriorly, outer half forming an oblique angle with straight lateral margin (Fig. 3); from scape to flagellomere III in ratio of 1.6:1.0:1.2:1.5:1.4 in length; scape, from scape to flagellomere III, IX and XI 2.9, 2.2, 2.6, 3.0, 3.0, 4.0 and 6.1X as long as wide, respectively (Fig. 4); eye 0.54 mm long, LE 1.7X as wide as OOL; WF 2.1X as wide as WOT; WF 1.2X as wide as LE; ocelli large and bulged, forming a compact angle; POL 1.6X as wide as AOL; OOL 1.0X as wide as WOT (Fig. 2).

Mesosoma (Figs 5 and 6): pronotum 0.5X as long as wide with an anterior transverse carinae; deep punctures forming a transverse line posteriorly; punctures on pronotum, mesoscutum and scutellum sparser than those on head; scutellum with a deep anterior groove (Fig. 5); propodeal disc 1.0X as long as wide with a pair of distinct outer submedian discal carinae and a pair of incomplete inner submedian discal carinae; median

Table 1 Biometric data of *Holepyris brevicarinatus* sp. nov. and *H. crinitus* sp. nov

Part	<i>Holepyris brevicarinatus</i> sp. nov. (<i>n</i> = 9)		<i>Holepyris crinitus</i> sp. nov. (<i>n</i> = 10)	
	mean (mm)	range (mm)	mean (mm)	range (mm)
TL	5.14	4.70–5.46	3.99	3.38–4.32
LH	1.06	0.94–1.14	0.86	0.74–0.94
WH	1.02	0.90–1.10	0.84	0.74–0.92
WF	0.60	0.53–0.66	0.53	0.47–0.57
LE	0.52	0.47–0.57	0.40	0.34–0.45
DAO	0.12	0.10–0.13	0.08	0.06–0.09
WOT	0.29	0.25–0.31	0.23	0.20–0.26
POL	0.11	0.09–0.12	0.11	0.09–0.13
AOL	0.07	0.06–0.08	0.06	0.05–0.07
OOL	0.31	0.27–0.34	0.29	0.25–0.31
LP	0.50	0.39–0.82	0.33	0.27–0.36
WP	0.88	0.75–1.01	0.72	0.62–0.81
LPD	0.70	0.64–0.78	0.54	0.51–0.57
WPD	0.73	0.66–0.82	0.53	0.51–0.55
LFW	3.62	3.39–3.90	2.79	2.52–3.12
LM	1.99	1.71–2.24	1.54	1.31–1.66
LAnt I	0.36	0.32–0.40	0.28	0.23–0.31
LAnt II	0.23	0.20–0.25	0.19	0.17–0.21
LAnt III	0.30	0.26–0.33	0.25	0.21–0.29
LAnt IV	0.32	0.26–0.36	0.25	0.22–0.29
LAnt V	0.32	0.27–0.35	0.26	0.20–0.30
LAnt XI	0.28	0.26–0.31	0.23	0.19–0.26
LAnt XIII	0.31	0.29–0.34	0.26	0.23–0.28
WAnt I	0.14	0.13–0.16	0.12	0.10–0.13
WAnt II	0.10	0.09–0.11	0.09	0.08–0.12
WAnt III	0.11	0.10–0.12	0.10	0.07–0.11
WAnt IV	0.12	0.11–0.13	0.10	0.09–0.11
WAnt V	0.11	0.10–0.12	0.10	0.09–0.11
WAnt XI	0.08	0.07–0.09	0.07	0.06–0.08
WAnt XIII	0.06	0.05–0.07	0.06	0.06–0.07

AOL, antero-posterior ocellar line; DAO, diameter of anterior ocellus; LAntI–V and XIII, length of antennal segments I–V, and XIII; LE, length of compound eye in lateral view; LFW, length of forewing; LH, length of head excluding mandibles; LM, length of mesosoma; LP, length of pronotum excluding anterior ocellar; LPD, length of propodeal disc (measured from anterior margin to transverse carina, if transverse carina present, from anterior margin to posterior part which connect with metasoma (if transverse absent); OOL, ocello-ocular line; POL, posterior ocellar line; TL, total length; WAntI–V and XIII, width of antennal segments I–V and XIII; WF, width of frons; WH, width of head; WOT, width of ocellar triangle; WP, width of pronotum; WPD, width of propodeal disc.

discal carina 0.8X as long as LPD, two pairs of submedian discal carinae 0.6X as long as LPD, sublateral carinae present from discal 1/3 to transverse carina, interspace of submedian carinae and sublateral area with irregular rugae, transverse carina with straight margin posteriorly; propodeal declivity without median longitudinal carina (Fig. 6).

Metasoma (Fig. 8): smooth and shining with more dense hairs discally.

Genitalia (Fig. 9): paramere with round apex, discal margin with seven hairs; vosella with thin cuspis; cuspis shorter than paramere with seven hairs at apex; aedeagus bottle-shaped, basal margin round; digitus as long as cuspis with curved apex outward.

Etymology

The species epithet, “*brevicarinatus*”, is derived from the short median discal carinae, the Latin “*brevis* (short, small) + *carina* (ridge)”.

Specimens examined. All specimens were collected in South Korea. **Holotype.** Male, Miwon, Cheongwon, CB, 9–16.ix.2005, Joohwan Han leg. **Paratypes.** 3 males, Suraksan, Sanggye, Nowon, Seoul, N37°40'45"E127°05'28", Altitude 200 m, 24.viii. –6.ix.2007, Jongok Lim leg.; 1 male, Kwanak arboretum, Manan, Anyang, GG, N37°25'14" E126°57'01", Altitude 175 m, 15.ix. –6.x.2007, Jongok Lim leg.; 1 male, Taehwasan, Sanglim, Docheok, Gwangju, GG, N37°18'5.3"E127°19'1.5", Altitude 219 m, 20.vii. –31.viii. 2007, Jongok Lim leg.; 4 males, Suraksan, Sanggye, Nowon, Seoul, N37°40'45", E127°05'28", Alt. 200 m, 18.vii. –24.viii.2007, Jongok Lim leg.

Remarks

This species is similar to *H. sinensis* Xu *et al.* 2003 from China in the “wide head, subtriangular median lobe of clypeus, five discal carinae on propodeal disc, distinct inner submedian discal carinae, and two pairs of submedian carinae with similar length, through at the basal 0.7X of LPD”. However, it can be distinguished from the latter by the following characteristics: WF 1.2X as wide as LE (1.4X as wide as LE in *H. sinensis*); OOL as wide as WOT (1.1X in *H. sinensis*); median discal carina 0.8X as long as LPD (median carina reaching the transverse carina completely in *H. sinensis*).

Holepyris crinitus Lim and Lee sp. nov.

(Figs 10–18, Table 1)

Description

Male (Holotype).

Colour

Head black; mandible and tip of clypeus brown; antenna blackish brown with apical 1/5 of scape and pedicel brown.

Mesosoma: pronotum, mesoscutum and scutellum black; forewing hyaline, wing veins testaceous (Fig. 16);

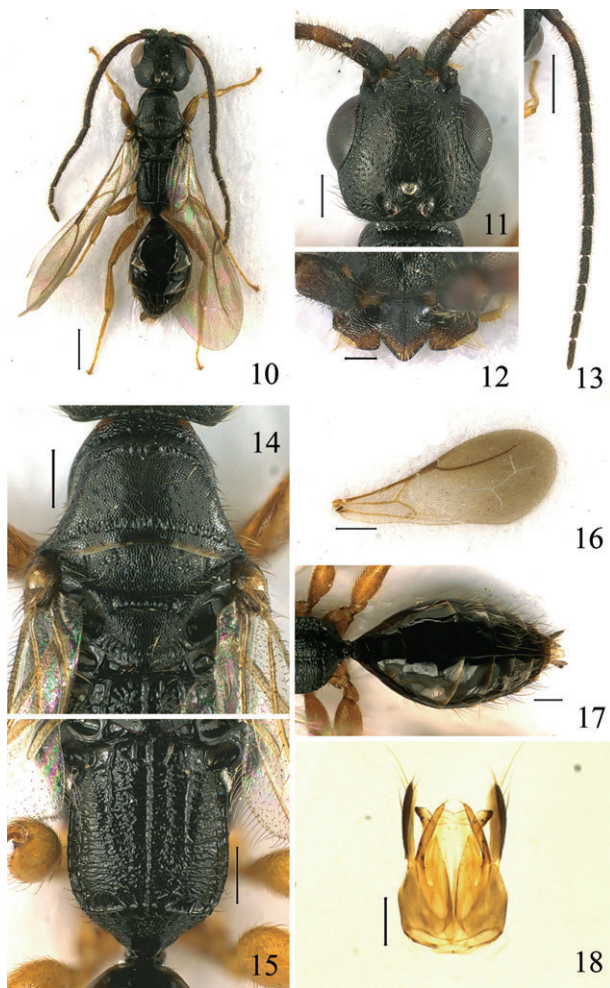


Figure 10–18 *Holepyris crinitus* sp. nov. (Male) 10 Whole body. 11 Head. 12 Clypeus. 13 Antenna. 14 Pronotum and mesonotum (dorsal view). 15 Propodeum. 16 Right forewing. 17 Metasoma (dorsal view). 18 Genitalia (dorsal view) (Scale bars. 12, 18: 0.10 mm; 11, 14, 15, 17: 0.20 mm; 10, 13, 16: 0.50 mm).

legs yellowish brown except basal half of coxae and basal 2/3 of femora brown.

Metasoma black.

Morphology

Body (Fig. 10) 3.85 mm long with numerous micro-polygons.

Head (Figs 11–13): 1.0X as long as wide with straight posterior margin in full face view, dorso-lateral corner round; frons and vertex micro-reticulated with many shallow punctures, each puncture apart by 2.0–3.0X as wide as their diameter; mandible slender with an apical tooth; clypeus short, tip of median lobe round, inner half of lateral lobes truncated anteriorly,

outer half oblique with concave lateral margin (Fig. 12); first five antennal segments in ratio of 1.5:1.0:1.2:1.3:1.3 in length; from scape to flagellomere III, IX and XI 2.3, 2.2, 2.2, 2.2, 2.4, 3.2 and 4.5X as long as wide, respectively (Fig. 13); eye 0.41 mm long; LE 1.4X as wide as OOL; WF 2.2X as wide as WOT; WF 1.3X as wide as LE; ocelli forming a compact triangle, POL 1.9X as wide as AOL; OOL 1.3X as wide as WOT (Fig. 11).

Mesosoma (Figs 14 and 15): pronotum 0.5X as long as wide with anterior transverse carina; pronotum with small shallow punctures, mesoscutum and scutellum micro-polygons with few punctures; scutellum with anterior transverse groove (Fig. 14); propodeal disc 1.0X as long as wide, with distinct three longitudinal discal carinae, median discal carina reaching transverse carina, a pair of submedian discal carinae 0.6X as long as LPD, interspace of discal carinae sublateral area thin with irregular transverse rugae, sublateral carinae present from discal 1/3 to transverse carinae, widest at discal 1/3 of disc, propodeal declivity without median longitudinal carina (Fig. 15).

Metasoma (Fig. 17): smooth and shining with more dense hairs discally.

Genitalia (Fig. 18): paramere with rounded apex, discal margin with a pair of long hairs and remaining part with hairs about half of that; volsella with thin cupis about 0.8X as long as paramere with five apical hairs; aedeagus bottle-shaped, basal margin round; digitus as long as cupis, angulated outward.

Etymology

The species epithet is derived from the Latin word “*crinitus*” (long haired), and refers to the long haired antennal segments.

Specimens examined. All specimens were collected in South Korea. **Holotype.** Male, Suraksan, Sanggye, Nowon, Seoul, N37°40'45"E127°05'28", Altitude 200 m, 7.ix. –6.x.2007, Jongok Lim leg. **Paratypes.** 1 male with the same data as holotype, Jongok Lim leg.; 2 males, Kwanak arboretum, Manan, Anyang, GG, N37°25'14"E126°57'01", Altitude 175 m, 31.viii. –14.ix.2007, Jongok Lim leg.; 1 male, Suraksan, Sanggye, Nowon, Seoul, N37°40'33" E127°03'15.5", Altitude 230 m, 7.ix. –6.x.2007, Jongok Lim leg.; 1 male, *ditto*, 7–25.x.2007, Jongok Lim leg.; 1 male, Taehwasan, Sanglim, Docheok, Gwangju, GG, N37°18'32.7" E127°18'7.2", Altitude 243 m, 20.vii. –31.viii.2007, Jongok Lim leg.; 1 male, *ditto*, 15.ix. –6.x.2007, Jongok Lim leg.; Kwanak arboretum, Manan, Anyang, GG, N37°25'06"E126°56'50",

Altitude 140 m, 15.ix. –25.x.2007, Jongok Lim leg.; 1 male, Jinae, Dong, Chuncheon, GW, 8.viii. –16.viii. 2007. Seokjoon Jang leg.

Remarks

This species is similar to the Chinese *H. fulvus* Xu *et al.* 2003, in the colour of mandible and clypeus, straight posterior margin of head, round median lobe of clypeus, 3rd antennal segment more than 2.0X as long as wide, proportion of pronotum and propodeal disc, three discal carinae on propodeal disc. However, it can be distinguished from the latter by the following characteristics: apical 1/5 of scape and 2nd antennal segment brown (antennae blackish brown except for basal three segments brown in *H. fulvus*); head 1.1X as long as wide (as long as wide in *H. fulvus*); head and mesonotum with very shallow punctures (with strong punctures in *H. fulvus*).

***Holepyris dimidiatus* Lim and Lee sp. nov.**

(Figs 19–27, Table 2)

Description

Male (Holotype).

Colour

Head black; mandibles, tip of clypeus and antennal socket brown; antenna dark brown except basal half of scape and pedicel brown.

Mesosoma black; forewing hyaline, wing veins testaceous (Fig. 25); legs yellow.

Metasoma black.

Morphology

Body (Fig. 19) 3.53 mm long with numerous micro-polypogons.

Head (Figs 20–22): 1.1X as long as wide with straight posterior margin in full face view; dorso-lateral margin round; frons and vertex micro-reticulated with many shallow punctures, each puncture apart by 2.0–3.0X as wide as their diameter; mandible slender with an apical tooth; clypeus with round median lobe, inner half of lateral lobes truncated anteriorly, outer half forming an oblique angle with convex lateral margin (Fig. 21); from scape to flagellomere III in ratio of 1.7:1.0:1.1:1.2:1.3 in length; from scape to flagellomere III, IX and XI 2.7, 1.9, 2.3, 2.4, 2.5, 2.5 and 3.7X as long as wide, respectively (Fig. 22); eye 0.29 mm long; LE 1.0X as wide as OOL; WF 2.2X as wide as WOT; WF 1.5X as wide as LE; ocelli forming a compact angle, POL 1.5X as wide as AOL, OOL 1.4X as wide as WOT (Fig. 20).

Mesosoma (Figs 23 and 24): pronotum 0.5X as long as wide with an anterior transverse carinae; punctures

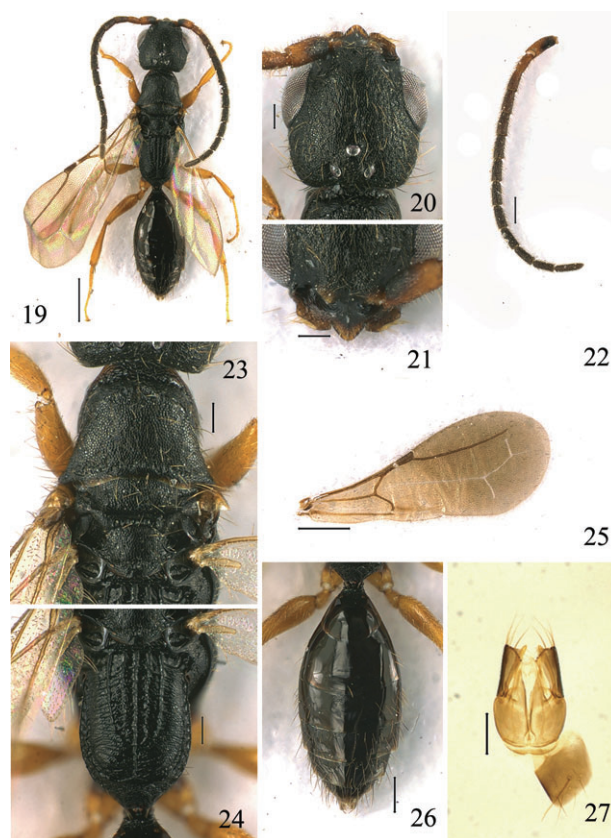


Figure 19–27 *Holepyris dimidiatus* sp. nov. (Male) 19 Whole body. 20 Head. 21 Clypeus. 22 Antenna. 23 Pronotum and mesonotum (dorsal view). 24 Propodeum. 25 Right forewing. 26 Metasoma (dorsal view). 27 Genitalia (dorsal view) (Scale bars. 20, 21, 23, 24, 27: 0.10 mm; 22, 26: 0.20 mm; 19, 25: 0.50 mm).

on pronotum, mesoscutum and scutellum sparser than those on head, scutellum with anterior transverse groove (Fig. 23); propodeal disc 1.1X as long as wide, with a pair of distinct outer submedian discal carinae and a pair of incomplete inner submedian discal carinae, inner and outer pairs of submedian carinae 0.5X as long as LPD, interspace of discal carinae with short transverse rugae and sublateral area with thin transverse rugae with convex transverse carina, sublateral carinae present from discal half to transverse carina; propodeal declivity with micropolypogons without median longitudinal carinae (Fig. 24).

Metasoma (Fig. 26): smooth and shining with more dense hairs distally.

Genitalia (Fig. 27): paramere with round apex, distal margin with seven hairs; vosella with thin cuspis; cuspis longer than paramere with parallel sides and widest at apical 1/3, and with two long hairs and one hair on inner apical position; aedeagus bottle-shaped, basal

Table 2 Biometric data of *Holepyris dimidiatus* sp. nov. and *H. longicephalus* sp. nov

Part	<i>Holepyris dimidiatus</i> sp. nov. (<i>n</i> = 2)		<i>Holepyris longicephalus</i> sp. nov. (<i>n</i> = 7)	
	mean (mm)	range (mm)	mean (mm)	range (mm)
TL	3.49	3.45–3.53	2.93	2.67–3.25
LH	0.73	0.71–0.74	0.66	0.56–0.74
WH	0.64	0.61–0.67	0.59	0.48–0.68
WF	0.42	0.41–0.43	0.40	0.34–0.46
LE	0.28	0.27–0.29	0.29	0.27–0.32
DAO	0.05	0.05–0.05	0.05	0.05–0.07
WOT	0.19	0.18–0.20	0.17	0.14–0.20
POL	0.10	0.10–0.11	0.09	0.07–0.10
AOL	0.07	0.06–0.07	0.05	0.04–0.06
OOL	0.27	0.27–0.28	0.25	0.22–0.27
LP	0.32	0.32–0.32	0.28	0.21–0.36
WP	0.56	0.54–0.59	0.52	0.39–0.65
LPD	0.49	0.48–0.50	0.41	0.34–0.48
WPD	0.44	0.42–0.46	0.37	0.29–0.44
LFW	2.40	2.38–2.43	2.28	2.26–2.30
LM	1.34	1.33–1.36	1.28	1.21–1.39
LAnt I	0.26	0.26–0.26	0.21	0.17–0.24
LAnt II	0.16	0.16–0.16	0.14	0.12–0.15
LAnt III	0.17	0.17–0.17	0.15	0.12–0.19
LAnt IV	0.18	0.17–0.19	0.17	0.14–0.21
LAnt V	0.19	0.18–0.20	0.17	0.14–0.21
LAnt XI	0.17	0.17–0.18	0.17	0.14–0.19
LAnt XIII	0.23	0.22–0.24	0.21	0.18–0.23
WAnt I	0.10	0.10–0.10	0.09	0.08–0.11
WAnt II	0.08	0.07–0.08	0.07	0.06–0.08
WAnt III	0.07	0.07–0.08	0.07	0.05–0.09
WAnt IV	0.08	0.08–0.08	0.07	0.06–0.09
WAnt V	0.08	0.08–0.08	0.07	0.06–0.09
WAnt XI	0.07	0.07–0.07	0.06	0.05–0.06
WAnt XIII	0.06	0.05–0.06	0.05	0.04–0.06

AOL, antero-posterior ocellar line; DAO, diameter of anterior ocellus; LAntI–V and XIII, length of antennal segments I–V, and XIII; LE, length of compound eye in lateral view; LFW, length of forewing; LH, length of head excluding mandibles; LM, length of mesosoma; LP, length of pronotum excluding anterior ocellar; LPD, length of propodeal disc (measured from anterior margin to transverse carina, if transverse carina present, from anterior margin to posterior part which connect with metasoma (if transverse absent); OOL, ocello-ocular line; POL, posterior ocellar line; TL, total length; WAntI–V and XIII, width of antennal segments I–V and XIII; WF, width of frons; WH, width of head; WOT, width of ocellar triangle; WP, width of pronotum; WPD, width of propodeal disc.

margin round; digitus shorter than cuspis, as long as paramere with its apex curved outward.

Etymology

The specific epithet is derived from the Latin word “*dimidiatus*” (half), which refers to the two pairs of short submedian discal carinae, that are about 0.5X as long as LPD.

Specimens examined. All specimens were collected in South Korea. **Holotype.** Male, Suraksan, Sanggye, Nowon, Seoul, N37°40′33″E127°03′15.5″, Altitude 230 m, 7.ix. –6.x.2007, Jongok Lim leg. **Paratype.** 1 male, Suraksan, Sanggye, Nowon, Seoul, N37°40′45″E127°05′28″, Altitude 200 m, 7.ix. –6.x.2007, Jongok Lim leg.

Remarks

This species resembles *H. susanowo* Terayama 1999, from Japan and Taiwan, by the head with straight posterior margin, narrow round median lobe of clypeus, five discal carinae on propodeal disc, short outer submedian discal carinae, inner pair of submedian discal carinae attaining the middle of disc. But it differs from the latter by the following characteristics: dark brown antenna except apical half of scape and 2nd segment brown, head 1.1X as long as wide (1.3X as long as wide in *H. susanowo*); 3rd antennal segment 2.3X as long as wide (short, 0.6X as long as wide in *H. susanowo*) and outer submedian discal carinae about 0.5X as long as LPD (0.3X as long as LPD in *H. susanowo*).

Holepyris longicephalus Lim and Lee sp. nov.

(Figs 28–36, Table 2)

Description

Male (Holotype).

Colour

Head black; mandible, tip of antennal socket and clypeus brown; antenna dark brown except basal 3/4 of scape black and apical 1/4 of scape, pedicel and flagellomere I brown.

Mesosoma: pronotum, mesoscutum and scutellum entirely black; forewing hyaline, wing veins testaceous (Fig. 34); all coxae, fore and hind femora brown, remaining segments yellow.

Metasoma black with a pair of small yellow spots on tergites.

Morphology

Body (Fig. 28) 3.16 mm long with numerous micropolygons.

Head (Figs 29–31): 1.1X as long as wide with concave posterior margin in full face view; dorso-lateral corner round; frons and vertex micro-reticulated with many shallow punctures (Fig. 29); mandible slender with an apical tooth; clypeus short; median lobe broadly round; inner half of lateral lobes truncated anteriorly, outer half forming an oblique angle with concave lateral margin (Fig. 30); from scape to flagellomere III in ratio of 1.8:1.0:1.2:1.4:1.2 in length; from scape to flagellomere III, IX and XI 2.6, 2.2, 2.4, 2.6, 2.3, 2.8 and 4.1X as

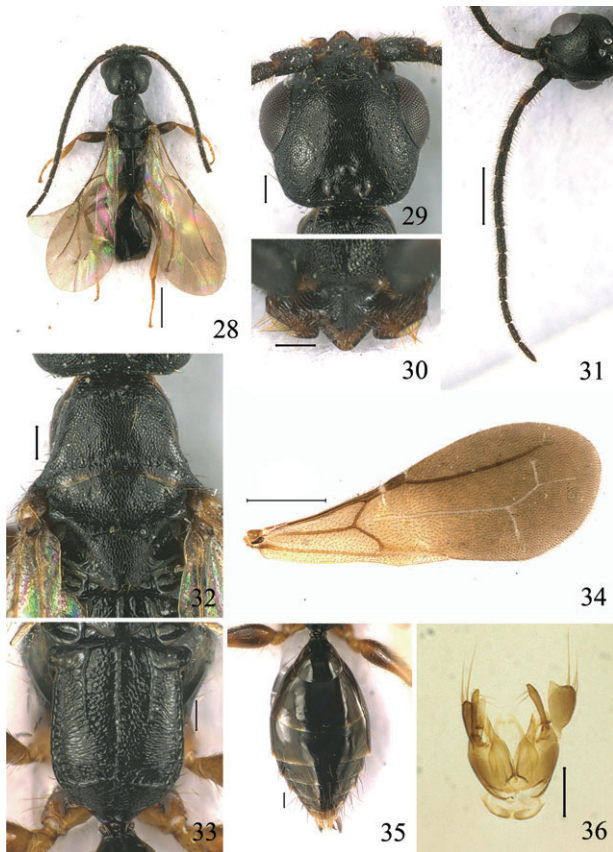


Figure 28–36 *Holepyris longicephalus* sp. nov. (Male) 28 Whole body. 29 Head. 30 Clypeus. 31 Antenna. 32 Pronotum and mesonotum (dorsal view). 33 Propodeum. 34 Right forewing. 35 Metasoma (dorsal view). 36 Genitalia (dorsal view) (Scale bars. 29, 30, 32, 33, 35, 36: 0.10 mm; 28, 31, 34: 0.50 mm).

long as wide, respectively (Fig. 31); eye 0.30 mm long; LE 1.2X as wide as OOL; WF 2.4X as wide as WOT; WF 1.5X as wide as LE; ocelli forming a compact angle, POL 1.5X as wide as AOL; OOL 1.4X as wide as WOT (Fig. 29).

Mesosoma (Figs 32 and 33): pronotum 0.6X as long as wide with anterior transverse carina; pronotum, mesoscutum and scutellum micro-reticulated with many shallow punctures; scutellum with transverse groove (Fig. 32); propodeal disc 1.2X as long as wide with distinct three discal carinae; median discal carina reaching transverse carina, a pair of submedian discal carinae 0.6X as long as LPD and outward distally, median area reticulated, sublateral area reticulated coarsely with thin transverse rugae, sublateral carinae present from distal half to transverse carina, transverse carina convex, propodeal declivity without median longitudinal carina (Fig. 33).

Metasoma (Fig. 35): smooth and shining with dense hairs discally.

Genitalia (Fig. 36): paramere with angulated ventral apex, discal margin with five long hairs; volsella with cuspis longer than paramere; cuspis with two long hairs and two short hairs; aedeagus bottle-shaped, basal margin rounded, digitus angulated outward.

Etymology

The species epithet, “*longicephalus*”, is derived from the comparatively long head, the Latin “longus (long, tall) + cephalus (head)”.

Specimens examined. All specimens were collected in South Korea. **Holotype.** Male, Goyang, Deogyang, Goyang, GG, N37°42'33"E126°53'39", Altitude 200 m, 24.viii.–6.ix.2007, Jongok Lim leg.; **Paratypes.** 1 male, Suraksan, Sanggye, Nowon, Seoul, N37°40'33"E127°03'15.5", Altitude 230 m, 7.ix.–6.x.2007, Jongok Lim leg.; 1 male, Goyang, Deogyang, Goyang, GG, N37°42'33"E126°53'39", Altitude 200 m, 7.ix.–6.x.2007, Jongok Lim leg.; 1 male, Seongsanbong, Wando, JN, 11–16.viii.2007, Jongok Lim leg.; 1 male, Jinae, Dong, Chuncheon, GW, 13–20.ix.2005, leg. Seokjoon Jang; 1 male, Miwon, Miwon, Cheongwon, CB, 16–23.ix.2005, Joohwan Han leg.; 1 male, Majeong, Buk, Jeongeub, JB, 12–19.vii.2005, Jiwon Park leg.

Remarks

This species resembles *H. fuscus* Xu *et al.* 2003 from China in the “brown clypeus and mandible, head longer than wide with slightly concave posterior dorsal margin, subtriangular median lobe of clypeus, three discal carinae on propodeum and so on”. However, it can be distinguished from the latter by the following characteristics: apical 1/4 of scape, 2nd and 3rd antennal segments brown (antennae dark brown except tips of scape brown and 2nd segment brown in *H. fuscus*); first five antennal segments in ratio of 1.8:1.0:1.2:1.4:1.2 in length (1.3:1.1:1.2:1.3:1.3 in *H. fuscus*); WF 1.5X as wide as LE (1.8X as wide as LE in *H. fuscus*); a pair of submedian carinae 0.6X as long as LPD and divergent distally (0.5X as long as LPD in *H. fuscus*).

Holepyris mucro Lim and Lee sp. nov.

(Figs 37–45, Table 3)

Description

Male (Holotype).

Colour

Head black except mandible brown; antenna dark brown except pedicel brown.

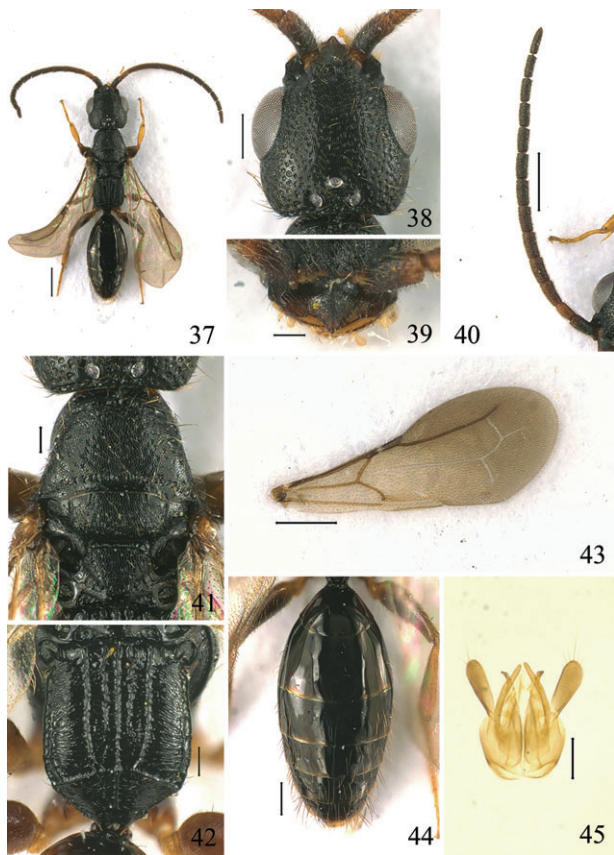


Figure 37–45 *Holepyris mucro* sp. nov. (Male) 37 Whole body. 38 Head. 39 Clypeus. 40 Antenna. 41 Pronotum and mesonotum (dorsal view). 42 Propodeum. 43 Right forewing. 44 Metasoma (dorsal view). 45 Genitalia (dorsal view) (Scale bars. 39, 41, 42, 45: 0.10 mm; 38, 44: 0.20 mm; 37, 40, 43: 0.50 mm).

Mesosoma black entirely, forewing hyaline, wing veins testaceous (Fig. 43); coxae dark brown, fore and hind femora dark brown, apical half of middle femur dark brown, fore tibiae and tarsi yellowish brown, middle and hind tibiae and tarsi brown.

Metasoma black.

Morphology

Body (Fig. 37) 3.82 mm long with numerous micropolygones.

Head (Figs 38–40): 1.1X as long as wide with straight posterior margin in full face view, dorso-lateral corner forming obtuse angle; frons and vertex micro-reticulated with numerous deep puncture, each puncture apart by about 1.0 or 2.0X as wide as their diameter (Fig. 38); mandible slender with an apical tooth; median lobe of clypeus sharply angulated, lateral lobes round broadly (Fig. 39); from scape to flagellomere III in ratio of

Table 3 Biometric data of *Holepyris mucro* sp. nov. and *H. multo* sp. nov

Part	<i>Holepyris mucro</i> sp. nov. (n = 10)		<i>Holepyris multo</i> sp. nov. (n = 2)	
	mean (mm)	range (mm)	mean (mm)	range (mm)
TL	3.91	3.58–4.24	3.43	3.33–3.53
LH	0.81	0.75–0.86	0.77	0.72–0.82
WH	0.77	0.72–0.81	0.74	0.9–0.78
WF	0.50	0.46–0.54	0.49	0.45–0.53
LE	0.33	0.32–0.36	0.32	0.30–0.34
DAO	0.06	0.05–0.08	0.06	0.06–0.07
WOT	0.23	0.21–0.25	0.20	0.18–0.21
POL	0.13	0.12–0.14	0.10	0.09–0.11
AOL	0.07	0.06–0.07	0.07	0.06–0.07
OOL	0.29	0.27–0.31	0.28	0.26–0.30
LP	0.36	0.32–0.38	0.29	0.26–0.33
WP	0.69	0.61–0.74	0.63	0.56–0.70
LPD	0.44	0.40–0.47	0.44	0.40–0.48
WPD	0.55	0.50–0.59	0.50	0.46–0.53
LFW	2.49	2.35–2.64	2.43	2.34–2.52
LM	1.48	1.41–1.55	1.35	1.28–1.42
LAnt I	0.26	0.23–0.29	0.26	0.25–0.28
LAnt II	0.16	0.15–0.17	0.18	0.16–0.19
LAnt III	0.20	0.18–0.22	0.20	0.18–0.22
LAnt IV	0.21	0.19–0.23	0.20	0.18–0.21
LAnt V	0.21	0.19–0.24	0.20	0.18–0.22
LAnt XI	0.19	0.18–0.22	0.18	0.17–0.18
LAnt XIII	0.24	0.22–0.26	0.22	0.19–0.24
WAnt I	0.11	0.09–0.15	0.09	0.09–0.10
WAnt II	0.09	0.08–0.10	0.08	0.08–0.08
WAnt III	0.10	0.09–0.11	0.09	0.08–0.09
WAnt IV	0.11	0.09–0.12	0.09	0.08–0.09
WAnt V	0.10	0.08–0.11	0.09	0.08–0.09
WAnt XI	0.08	0.07–0.09	0.06	0.06–0.07
WAnt XIII	0.07	0.06–0.08	0.06	0.05–0.06

AOL, antero-posterior ocellar line; DAO, diameter of anterior ocellus; LAntI–V and XIII, length of antennal segments I–V, and XIII; LE, length of compound eye in lateral view; LFW, length of forewing; LH, length of head excluding mandibles; LM, length of mesosoma; LP, length of pronotum excluding anterior ocellar; LPD, length of propodeal disc (measured from anterior margin to transverse carina, if transverse carina present, from anterior margin to posterior part which connect with metasoma (if transverse absent)); OOL, ocello-ocular line; POL, posterior ocellar line; TL, total length; WAntI–V and XIII, width of antennal segments I–V and XIII; WF, width of frons; WH, width of head; WOT, width of ocellar triangle; WP, width of pronotum; WPD, width of propodeal disc.

1.7:1.0:1.3:1.3:1.2 in length; from scape to flagellomere III, IX and XI 2.9, 2.0, 2.3, 2.1, 2.2, 2.6 and 3.9X as long as wide, respectively (Fig. 40); eye 0.32 mm long, LE 1.2X as wide as OOL; WF 2.1X as wide as WOT; WF 1.5X as wide as LE; ocelli forming compact angle, POL 1.9X as wide as AOL; OOL 1.3X as wide as WOT (Fig. 38).

Mesosoma (Figs 41 and 42): pronotum 0.5X as long as wide with anterior transverse carina; punctures on pronotum, mesoscutum and scutellum sparser than those on head, scutellum with thin anterior transverse groove (Fig. 41); propodeal disc 0.8X as long as wide with a pair of distinct outer submedian discal carinae and a pair of inner incomplete submedian discal carinae, outer submedian discal carinae reaching transverse carina, inner submedian discal carinae 0.5X as long as LPD, sublateral carinae present from discal 2/3 to transverse carina; interspace of discal carinae with short transverse rugae, sublateral area with transverse rugae; transverse carina convex; propodeal declivity with micropolygons and with median longitudinal carina (Fig. 42).

Metasoma (Fig. 44): smooth and shining with more dense hairs discally.

Genitalia (Fig. 45): lateral margin of paramere round with round apex, discal margin with six hairs; vosella with thin, parallel; cuspis as long as paramere, without distinct long hairs and with round apex, aedeagus bottle-shaped, basal margin round, digitus shorter than cupis with its apex curved outward.

Etymology

The species epithet is derived from the Latin word “*muco*” (a sharp point, edge, dagger point), and refers to the distinctly angulated median lobe of clypeus.

Specimens examined. All specimens were collected in South Korea. **Holotype.** Male, Suraksan, Sanggye, Nowon, Seoul, N37°40'45"E127°05'28", Altitude 200 m, 24.viii.–6.ix.2007, Jongok Lim leg. **Paratypes.** 1 male, Majeong, Buk, Jeongeub, JB, 12–19.vii.2005, Jiwon Park leg.; 3 males, *ditto*, 26.vii.–2.viii.2005, leg. Jiwon Park; 2 males, Kwanak arboretum, Manan, Anyang, GG, N37°25'06"E126°56'50", Altitude 140 m, 15.ix.–25.x.2007, Jongok Lim leg.; 1 male, Taehwasan, Sanglim, Docheok, Gwangju, GG, N37°18'5.3"E127°19'1.5", Altitude 219 m, 20.vii.–31.viii.2007, Jongok Lim leg.; 1 male, Kwanak arboretum, Manan, Anyang, GG, N37°25'14"E126°57'01", Altitude 175 m, 26.x.–8.xi.2007, Jongok Lim leg.; 1 male, Namsa, Hyeongok, Kyeongju, GB, 8–15.ix.2005, Jongtae Moon leg.

Remarks

This new species resembles the Japanese *H. yebis* Terayama 2006, in the “mandible with an apical tooth, median lobe of clypeus distinctly angulated, five discal carinae on propodeal disc, median discal carina reaching transverse carina and two pairs of submedian discal carinae not reaching transverse carinae”. However, it can be distinguished from the latter by the following

characteristics: antenna dark brown except 2nd segment brown (antenna dark brown in *H. yebis*); head 1.1X as long as wide, with straight posterior margin in dorsal view (head as long as wide with concave posterior margin in dorsal view in *H. yebis*); 2nd and 3rd antennal segments 2.0 and 2.3X as long as wide, respectively (2nd segment 1.7X as long as wide and 3rd segment 2.0X as long as wide in *H. yebis*) and propodeal disc 0.8X as long as wide (0.7X as long as wide in *H. yebis*).

Holepyris multo Lim and Lee sp. nov.

(Figs 46–54, Table 3)

Description

Male (Holotype).

Colour

Head black; mandible, clypeus and antennal socket brown; antenna dark brown except apical 1/5 of scape and apical 1/3 of pedicel brown.

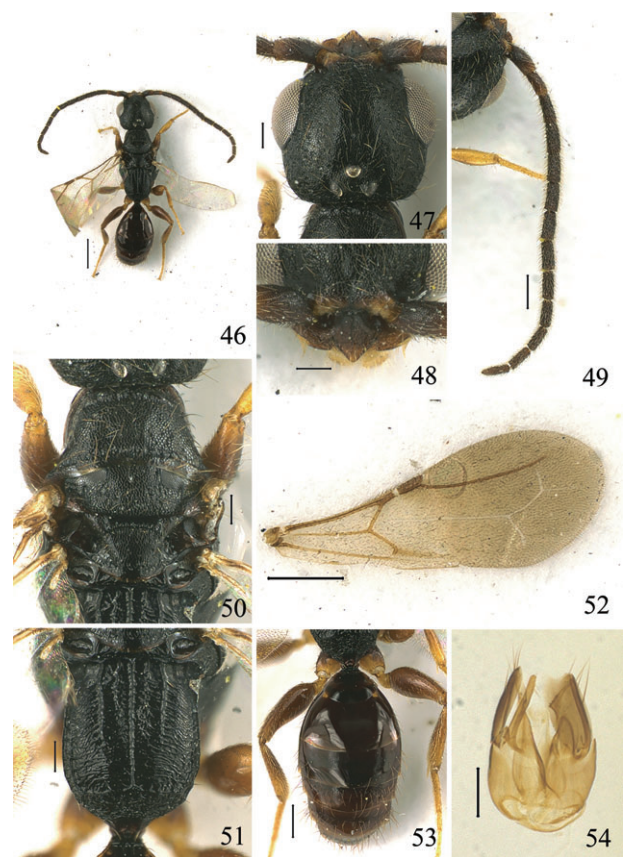


Figure 46–54 *Holepyris multo* sp. nov. (Male) 46 Whole body. 47 Head. 48 Clypeus. 49 Antenna. 50 Pronotum and mesonotum (dorsal view). 51 Propodeum. 52 Right forewing. 53 Metasoma (dorsal view). 54 Genitalia (dorsal view) (Male) (Scale bars. 47, 48, 50, 51, 54: 0.10 mm; 49, 53: 0.20 mm; 46, 52: 0.50 mm).

Mesosoma: pronotum, mesonotum and propodeum black entirely; forewing hyaline, wing veins testaceous (Fig. 52); coxae, femora, tibiae brown, remaining yellowish brown.

Metasoma dark brown, with a pair of basal yellow spots at dorsolateral position of 2nd metasomal tergite.

Morphology

Body (Fig. 46) 3.53 mm long with numerous micropoly-pogons.

Head (Figs 47–49): 1.0X as long as wide with straight posterior margin in full face view; dorso-lateral corner round; frons and vertex micro-reticulated with many shallow puncture, each puncture apart by about 2.0 or 3.0X as wide as their diameter (Fig. 47); mandible slender with apical tooth alone; clypeus short, median lobe of clypeus narrow round, inner half of lateral lobes truncated anteriorly, outer half oblique with convex lateral margin (Fig. 48); from scape to flagellomere III in ratio of 1.4:1.0:1.1:1.1:1.2 in length; from scape to flagellomere III, IX and XI 2.8, 2.3, 2.4, 2.3, 2.4, 2.8 and 4.0X as long as wide, respectively (Fig. 49); eye 0.34 mm long, LE 1.1X as wide as OOL; WF 2.6X as wide as WOT; WF 1.5X as wide as LE; ocelli forming compact triangle, POL 1.6X as wide as AOL; OOL 1.5X as wide as WOT (Fig. 47).

Mesosoma (Figs 50 and 51): pronotum 0.5X as long as wide with an anterior transverse carina; punctures on pronotum, mesoscutum and scutellum sparser than those on head; scutellum with thin transverse groove anteriorly (Fig. 50); propodeal disc 0.9X as long as wide with a pair of distinct outer submedian discal carinae and a pair of incomplete inner submedian discal carinae; outer submedian discal carinae 0.6X as long as LPD, inner submedian discal carinae 0.5X as long as LPD, sublateral carinae present from discal half to transverse carina; interspace of discal carinae with short transverse rugae and sublateral area with oblique rugae, transverse carina straight, propodeal declivity with median longitudinal carina (Fig. 51).

Metasoma (Fig. 53): smooth and shining with more dense hairs discally.

Genitalia (Fig. 54): paramere with round apex, one hair on mid-lateral position, apex with seven hairs; vosella thin and parallel; cuspis as long as paramere with round apex, and with two apical hairs at apical 1/4 position of inner margin; aedeagus bottle-shaped, basal margin round; digitus as long as cuspis with its apex curved outward.

Etymology

The species epithet is derived from the Latin word “*multo*” (by much, by far, by a great deal, by a lot), and

refers to the two pairs of submedian discal carinae distally apart from the transverse carina on LPD in dorsal view.

Specimens examined. All specimens were collected in South Korea. **Holotype.** Male, Donam, Banpo, Gongju, CN, 6–13.ix.2005, Yeontae Kim leg. **Paratype.** 1 male with the same locality as the holotype, 2–9.viii.2005, Yeontae Kim leg.

Remarks

This species is similar to *H. susanowo* Terayama 1999, from Japan and China, in having five discal carinae on propodeal disc, a pair of short outer submedian discal carinae, inner pair of submedian discal carinae reaching the middle of disc, and subtriangular median lobe of clypeus, but can be distinguished from the latter by the following characteristics: propodeal disc slightly shorter than wide, 0.9X as long as wide (1.3X as long as wide in *H. susanowo*); inner submedian discal carinae 0.5X as long as LPD (submedian discal carinae 0.3X as long as LPD in *H. susanowo*).

KEY TO SPECIES OF *HOLEPYRIS* IN SOUTH KOREA (BASED ON MALES)

1. Propodeal disc with three longitudinal carinae.2
– Propodeal disc with five longitudinal carinae.3
2. Head and propodeal disc distinctly longer than wide; a pair of submedian carinae of propodeal disc outward distally.*H. longicephalus* sp. nov.
– Head and propodeal disc as long as wide; a pair of submedian carinae of propodeal disc straight distally
.....*H. crinitus* sp. nov.
3. Median lobe of clypeus sharply angulated.
.....*H. mucro* sp. nov.
– Median lobe of clypeus round, not angulated.4
4. Median carina of propodeal disc reaching transverse carina; OOL distinctly wider than WOT.5
– Median carina of propodeal disc not reaching transverse carina; OOL as wide as WOT.
.....*H. brevicarinatus* sp. nov.
5. Head and propodeal disc longer than wide, transverse carina of propodeal disc concave.
.....*H. dimidiatus* sp. nov.
– Head and propodeal disc as long as wide, transverse carina of propodeal disc straight.
.....*H. multo* sp. nov.

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