

New Host Records of Ichneumonidae (Hymenoptera), with List of Ichneumon Wasps Parasitizing *Ivela auripes* (Butler) (Lepidoptera: Lymantriidae) from Korea

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한국산 매키벌과의 새로운 숙주 보고 및 황다리독나방에 기생하는 매키벌 목록

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ABSTRACT: We report new host records of four ichneumonids from Korea. They were discovered from the pupae of *Apatura metis* Frever (Lepidoptera: Nymphalidae), *Allotraeus sphaerioninus* Bates (Coleoptera: Cerambycidae) and *Ivela auripes* (Butler) (Lepidoptera: Lymantriidae) respectively. Diagnoses, illustrations, host records of the four species, and a list of ichneumon species parasitizing of *I. auripes* are provided.

Key words: *Allotraeus sphaerioninus*, *Apatura metis*, *Ivela auripes*, Ichneumonidae, Parasitoid

초록: 본 연구에서는 기생성 매키벌과의 4종에 대하여 새로운 숙주를 보고하고자 한다. 4종의 매키벌과는 황오색나비 (나비목: 네발나비과), 밤색하늘소 (딱정벌레목: 하늘소과), 황다리독나방 (나비목: 독나방과)의 번데기에서 각각 발견되었다. 본 논문에서는 매키벌과 4종의 간략한 식별형질과 사진정보, 황다리독나방에 기생하는 매키벌과의 목록을 제시 하였다.

검색어: 밤색하늘소, 황오색나비, 황다리독나방, 매키벌과, 기생벌

Ichneumonidae (Hymenoptera) are commonly known as “parasitoids” which are clearly the most important resources of biological control agents. Also, they as parasitoids provide the substantial economic and environmental benefits to natural ecosystem and human agricultural production (LaSalle and Gauld, 1993). This family is divided into 51 subfamilies including

four fossil groups, with more than 24,281 species classified into 1,579 genera worldwide (Yu et al., 2012). The family is cosmopolitan, with 603 species known from South Korea, 1,527 species from Japan, 2,039 species from China, and 3,418 species from Russia (Yu et al., 2012).

In this study, we report new host records of four ichneumon species from South Korea. *Psilomastax pyramidalis* Tischbein (Hymenoptera: Ichneumonidae) emerged from the pupae of *Apatura metis* Freyer (Lepidoptera: Nymphalidae). *A. iris*

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(Lepidoptera: Nymphalidae) and *Hestina assimilis* Linnaeus (Lepidoptera: Nymphalidae) have been recorded as hosts of *P. pyramidalis* (Yu et al., 2012). *Podoschistus scutellaris* (Desvignes) (Hymenoptera: Ichneumonidae) was reared from the pupae of *Allotraeus sphaerioninus* Bates (Coleoptera: Cerambycidae), and the wasp species is also known to be a parasitoid of *Lampra mirifica* (Mulsant) (Coleoptera: Buprestidae), *Pissodes harcyniae* (Herbst) (Coleoptera: Curculionidae), *Saperda carcharias* (Linnaeus) (Coleoptera: Cerambycidae), and *Tetropium castaneum* (Linnaeus) (Coleoptera: Cerambycidae) (Yu et al., 2012). *Apechthis rufata* (Gmelin) (Hymenoptera: Ichneumonidae) and *Pimpla disparis* Viereck (Hymenoptera: Ichneumonidae) parasitized pupae of *Ivela auripes* (Butler) (Lepidoptera: Lymantriidae).

Diagnoses, illustrations, host record, and distribution information of each species are provided. We also provide a list of ichneumon parasitoids on pupae of *Ivela auripes* (Butler) (Lepidoptera: Lymantriidae) from Korea (Table 4).

Materials and Methods

The specimens are deposited at the Animal Systematic Laboratory of Yeungnam University (YNU), National Institute of Biological Resources (NIBR), and Korea National Arboretum (KNA). The morphological terminology is mostly that of Gupta and Maheshwary (1977). Distribution data and host records are taken from Yu et al. (2012). Specimens were examined using an AxioCam MRc5 camera attached to a stereo microscope (Zeiss SteREO Discovery. V20; Carl Zeiss, Göttingen, Germany), processed using AxioVision SE64 software (Carl Zeiss), and optimized with a Delta imaging system (i-solution, IMT i-Solution Inc. Vancouver, Canada).

The following abbreviations are used in this paper:

HU, Hokkaido University, Faculty of Agriculture, Entomological Institute, Sapporo, Japan.

KNA, Korea National Arboretum, Pocheon, Korea.

KNPRI, Korea National Park Research Institute, Wonju, Korea

NHM, The Natural History Museum, Department of Entomology, London, England, United Kingdom.

NIBR, National Institute of Biological Resources, Incheon, Korea.

NR, Naturhistoriska Riksmuseet, Sektionen för Entomologi,

Stockholm, Sweden.

USNM, U.S. National Museum of Natural History, Smithsonian Institute, Washington, D.C., U.S.A.

YNU, Animal Systematic Laboratory of the Yeungnam University, Gyeongsan-si, South Korea

ZSM, Zoologisches Staatsammlung, Münchhausenstrasse, München, Germany.

CB, Chungcheongbuk-do; **GW**, Gangwon-do; **GG**, Gyeonggi-do; **GN**, Gyeongsangnam-do; **TD**, Type depository.

Results and Discussion

Systematic accounts: First record on host of Ichneumonidae

1. *Psilomastax pyramidalis* Tischbein, 1868 피라미덱시벌 (Figs. 1A-C)

Psilomastax pyramidalis Tischbein, 1868: 255. Type: female; TD: lost.

Psilomastax pictus Kriechbaumer 1882: 176. Lectotype: female; TD: ZSM.

Psilomastax pyramidalis: Kim, 1970: 412; Lee et al., 2012: 65.

Diagnosis. Head yellow with black marks at clypeus, malar space, frons, central face. Vertex black. Antenna black with median white band, 36 flagellomeres. Epomia distinct. Pronotum yellow with black spot medially and sparsely punctate. Mesoscutum without notaulus. Mesoscutellum yellow, with projection; postscutellum flat and yellow. Mesopleuron and legs yellow with black spots. Propodeum wrinkle with strong median longitudinal carina. Fore wing with areolet. Nervellus intercepted at 0.1 lower part; discoidella present. Metasoma densely punctate and longitudinal striate, with strong thyridium.

Material examined. 1 male, Korea, GW, Pyeongchang-gun, Yongpyeong-myeon, Imok-ri, 8.vi.2014, H.Y. Lee (leg) (ex. from pupa of *Apatura metis*) (NIBR).

Host: *Apatura metis* Freyer (Lepidoptera: Nymphalidae) (new record from Korea); *Apatura iris* (Lepidoptera: Nymphalidae), *Hestina assimilis* (Lepidoptera: Nymphalidae) (Yu et al., 2012).

Distribution: Korea, Austria, China (Guangdong, Heilongjiang, Hungary, Japan, Netherlands, Poland, Switzerland, United Kingdom.

Region: Eastern Palaearctic, Oriental, Western Palaearctic.

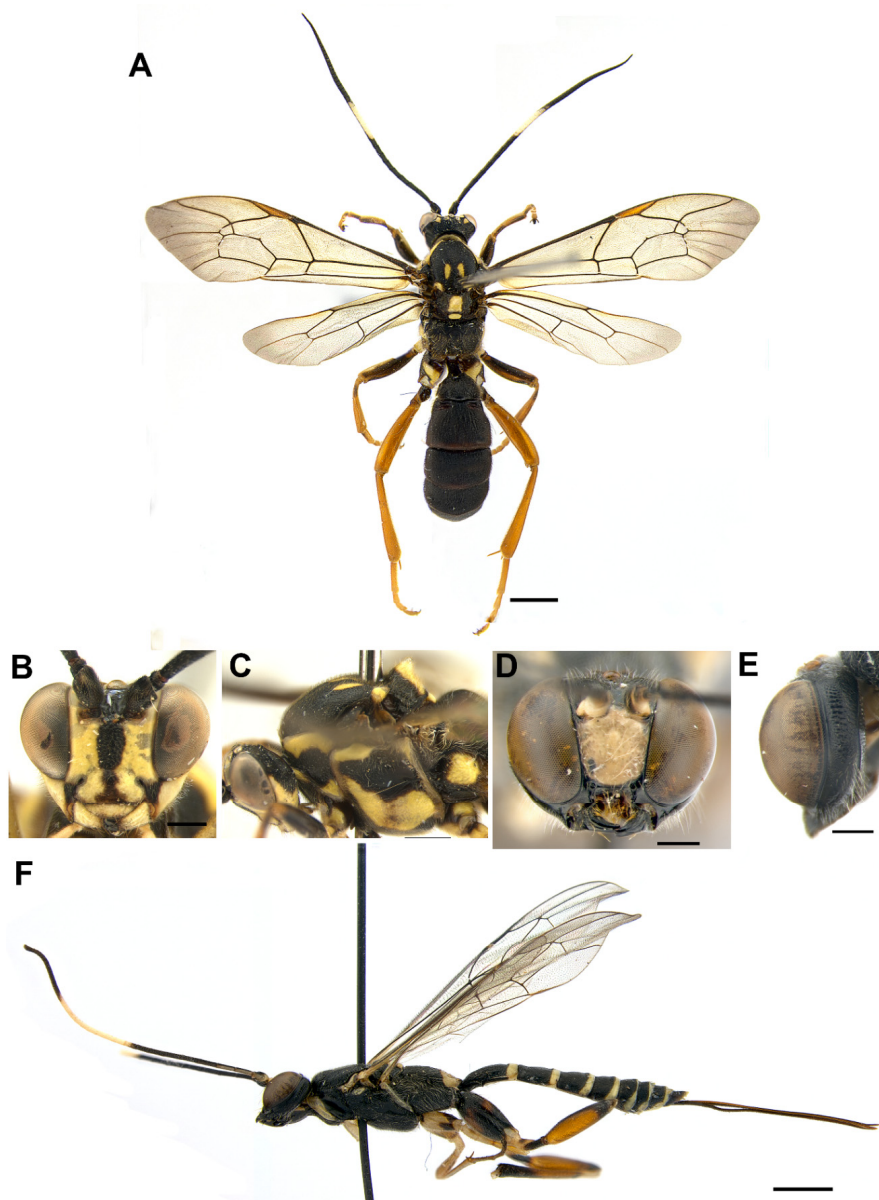


Fig. 1. *Psilomastax pyramidalis* (A-C) & *Podoschistus scutellaris* (D-F); A. Habitus in dorsal view, B. Head in frontal view, C. Mesosoma in lateral view, D. Head in frontal view, E. Temple, F. Habitus in lateral view. Scale bars: A, F = 2 mm, C = 1 mm, B, D, E = 0.5 mm.

2. *Podoschistus scutellaris* (Desvignes, 1856) 줄동양납작맴시벌 (Figs. 1D-F)

Xorides scutellaris Desvignes 1856: 1-120. Lectotype: female; TD: NHM.

Xorides wahlbergi Holmgren, 1860: 65. Type: male; TD: NR.

Xorides erosus Tschek, 1869: 269-280. Type: unknown; TD: unknown.

Podoschistus scutellaris: Suh et al., 2013: 137.

Diagnosis. Face and clypeus small, with scattered punctures.

Malar space very short. Upper half of temple coarsely denticulate. Antenna black with median yellow band, 36 flagellomeres. Epomia distinct. Pronotum broadly concaved at the center and matt. Mesoscutum strongly trilobite and coarsely punctate. Notauli strongly convergent and touching posteriorly. Mesoscutellum and postscutellum yellow. Propodeum wrinkle. Fore and mid legs yellowish brown. Hind coxa black with yellow spot at inner part; trochanter yellow, trochantellus black; femur and tibia brown to dark brown apically. Fore wing without areolet. Nervellus intercepted 1/4 of upper part; discoidella

present. Metasoma densely and finely punctate. Tergites black with apical rim of each tergites yellow. Ovipositor straight and as long as metasoma.

Material examined. 1 female, Korea, GG, Gapyeong-gun, Cheongpyeong-myeon, 3.v.2013, E.Y. Kang (leg) (ex. from *Allotraeus sphaerioninus*) (NIBR).

Host: *Allotraeus sphaerioninus* Bates (Coleoptera: Cerambycidae) (new record from Korea); *Lampra mirifica* (Coleoptera: Buprestidae); *Saperda carcharias* (Coleoptera: Cerambycidae), *Tetropium castaneum* (Coleoptera: Cerambycidae); *Pissodes harcyniae* (Coleoptera: Curculionidae) (Yu et al., 2012).

Distribution: Korea, Austria, Belgium, Bulgaria, Czech Republic, Slovakia, France, Germany, Hungary, India, Poland,

Romania, Russia (Bryansk, Sankt Petersburg), Sweden, United Kingdom.

Region: Eastern Palaearctic, Oriental, Western Palaearctic.

3. *Pimpla disparis* Viereck, 1911 나방살이납작맷시벌 (Fig. 2A)

Pimpla disparis Viereck, 1911: 475-480. Type: female; TD: USNM.

Pimpla porthetriae Viereck, 1911: 475-480. Type: male; TD: USNM.

Diagnosis. Body black. Face convex, clypeus flat, separated from face by carina. Antenna black, with 30 flagellomeres. Epomia distinct. Pronotum coarsely punctate with central

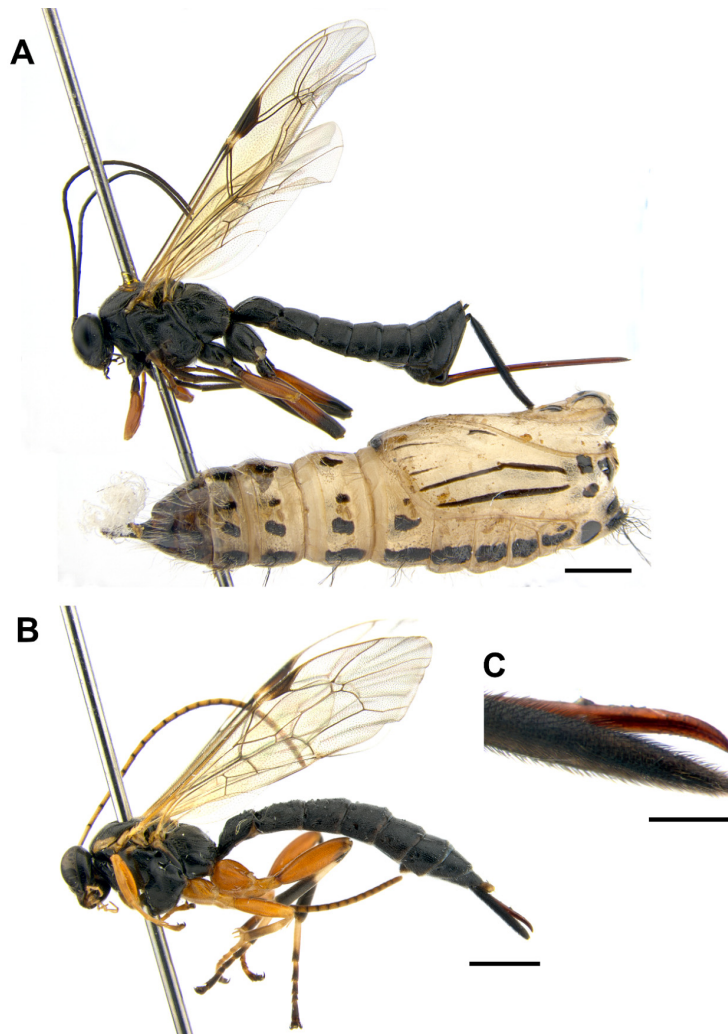


Fig. 2. *Pimpla disparis* (A) & *Apechthis rufata* (B-C). A. Habitus in lateral view, B. Habitus in lateral view, C. Ovipositor. Scale bars: A, B = 2 mm, C = 0.5 mm.

stripes. Mesoscutum with notaulus. Mesoscutellum and post scutellum convex and black. Propodeum rugosely and coarsely punctate. Fore and mid legs reddish brown except coxa and trochanter black. Hind leg black except femur reddish brown anterior part. Fore wing with areolet. Nervellus intercepted at 2/3 of the upper part; discoidella present. 1-2 tergites coarsely punctate, 3-6 tergites finely punctate. Ovipositor straight and dark reddish brown.

Material examined. 2 females, 2 males, Korea, GN, Gyejae-si, Ilun-myeon, Gujola-ri, 11.v.2014, H.Y. Oh (leg) (NIBR); 2 females, 2 males, GG, Pocheon-si, Korea National Arboretum, 26.v.2014, M.H. Kim (leg) (9-10.vi.2014, ex. from a psupa of *Ivela auripes*) (KNA); 1 female, *ditto*, 19.v.2014, Y.M. Shin, I.J. Choi, J.W. Nam (leg) (12.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, *ditto*, 21.v.2014, Y.M. Shin, S.Y. Park (leg) (9-10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, 1 male, *ditto*, 23.v.2014, Y.M. Shin, I.K. Kim (leg) (17.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, *ditto*, 26.v.2014, M.H. Kim (leg) (13-15.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, *ditto*, 26.v.2014, M.H. Kim (leg) (16.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 4 females, 10 males, *ditto*, 23.v.2014, Y.M. Shin, I.K. Kim (leg) (4-8.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 2 males, *ditto*, 26.v.2014, M.H. Kim (leg) (17.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 male, *ditto*, 26.v.2014, M.H. Kim (leg) (20-25.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, 3 males, *ditto*, 26.v.2014, M.H. Kim (leg) (4-8.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 male, *ditto*, 21.v.2014, Y.M. Shin, S.Y. Park (leg) (9-10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 male, *ditto*, 23.v.2014, Y.M. Shin, I.K. Kim (leg) (20-25.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, *ditto*, 23.v.2014, Y.M. Shin, I.K. Kim (leg) (12.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 male, *ditto*, 26.v.2014, M.H. Kim (leg) (10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA).

Host: Host records of *P. disparis* Viereck are summarized in Table 1.

Distribution: Korea, Canada, China (Anhui, Beijing, Fujian, Gansu, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Nei Menggu, Ningxia, Shaanxi, Shandong, Shanghai, Shanxi, Sichuan, Tianjin, Xizang, Yunnan,

Zhejiang), India, Japan, Mongolia, Russia (Amur, Buryatskaya Respublika, Irkutsk, Khabarovsk Kray, Primor'ye Kray, Sakhalin), U.S.A..

Region: Eastern Palaearctic, Nearctic, Oriental.

4. *Apechthis rufata* (Gmelin, 1790) 그멜린납작맴시벌 (Figs 2B-C)

Ichneumon rufata Gmelin, 1790: 2674-2722. Type: female; TD: lost.

Pimpla flavonotata Holmgren, 1860: 1-76. Type: unknown; TD: unknown.

Pimpla rufithorax Strobl, 1902: 3-48. Type: female; TD: unknown.

Apechthis geometriae Uchida, 1928: 1-115. Type: female; TD: HU.

Apechthis rufata: Choi et al., 2015: 17.

Diagnosis. Body black. Face convex, with yellow line at inner margins of eyes. Clypeus flat, separated from face by groove. Antenna yellow in ventral view and dark brown in dorsal view, with 25 flagellomeres. Epomia distinct. Pronotum glabrous centrally. Mesoscutum with yellow marks and notaulus. Mesoscutellum and postscutellum convex, yellow. Propodeum coarsely punctate with vestigial carinae. Fore and mid legs yellowish brown. Hind coxa and femur reddish brown; hind tibia black with yellow band; apical area of 1-3 tarsomeres and 4-5 tarsomeres blackish brown. Fore wing with areolet. Nervellus intercepted 2/3 of upper part; discoidella present. Metasoma coarsely punctate, with strong thyridium. Ovipositor downcurved and dark reddish brown.

Material examined. 1 female, Korea, GG, Pocheon-si, Korea National Arboretum, 26.v.2014, M.H. Kim (leg) (9-10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA).

Host: Host records of *A. rufata* (Gmelin) are summarized in Table 2.

Distribution: Korea, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bulgaria, China (Gansu, Heilongjiang, Henan, Hubei, Hunan, Zhejiang), Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Ireland, Italy, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Macedonia, Moldova, Netherlands, Norway, Pakistan, Poland, Romania, Russia (Astrakhanskaya, Chita, Irkutsk, Kamchatka, Khabarovsk Kray, Kirov, Krasnodar Kray, Kursk, Lipetsk,

Table 1. Host records of *Pimpla disparis* Viereck (Yu et al., 2012)

Order	Family	Scientific name	
Lepidoptera	Arctiidae	<i>Hyphantria cunea</i>	
	Geometridae	<i>Abraxas suspecta</i> , <i>Cystidia stratonice</i>	
	Hesperiidae	<i>Parnara guttata</i>	
	Lasiocampidae		<i>Dendrolimus punctatus</i> , <i>Dendrolimus spectabilis</i> , <i>Dendrolimus superans</i> , <i>Dendrolimus tabulaeformis</i> , <i>Euthrix albomaculata</i> , <i>Malacosoma americanum</i> , <i>Malacosoma neustria testacea</i> , <i>Selenephra lobulina</i>
	Lycaenidae	<i>Artopoetes pryeri</i> , <i>Lampides boeticus</i>	
	Lymantriidae	<i>Ivela auripes</i> (new host record), <i>Laelia coenosa paucipunctata</i> , <i>Leucoma salicis</i> , <i>Lymantria dispar</i> , <i>Lymantria dispar japonica</i> , <i>Orgyia antiqua</i> , <i>Teia antiqioides</i>	
	Noctuidae	<i>Oraesia excavate</i> , <i>Selepa celtis</i> , <i>Trisuloides sericea</i>	
	Nolidae	<i>Earias cupreoviridis</i> , <i>Earias pudicana</i> , <i>Eligma narcissus</i>	
	Notodontidae	<i>Clostera anachoreta</i>	
	Papilionidae	<i>Papilio machaon</i> , <i>Papilio xuthus</i> , <i>Parnassius citrinarius</i> , <i>Parnassius glacialis</i>	
	Pieridae	<i>Aporia crataegi</i> , <i>Pieris canidia</i> , <i>Pieris rapae</i> , <i>Pieris rapae crucivora</i>	
	Psychidae	<i>Canephora asiatica</i> , <i>Cryptothelea minuscula</i> , <i>Cryptothelea variegata</i> , <i>Cryptothelea variegata</i> , <i>Thyridopteryx ephemeraeformis</i>	
	Pyralidae		<i>Acrobasis cymindella</i> , <i>Conogethes punctiferalis</i> , <i>Dioryctria auranticella</i> , <i>Dioryctria pryeri</i> , <i>Dioryctria rubella</i> , <i>Dioryctria splendidella</i> , <i>Locastra muscosalis</i> , <i>Ostrinia furnacalis</i> , <i>Ostrinia nubilalis</i> , <i>Syllepte diniasalis</i>
	Saturniidae	<i>Samia cynthia</i>	
	Sesiidae	<i>Paradoxecia pieli</i> , <i>Synanthedon tenuis</i>	
	Tortricidae		<i>Adoxophyes orana</i> , <i>Ancylis sativa</i> , <i>Choristoneura diversana</i> , <i>Grapholita molesta</i> , <i>Homona magnanima</i> , <i>Homona magnanima</i> , <i>Homona magnanima</i> , <i>Hoshinoa longicellana</i> , <i>Ptycholomoides aeriferanus</i> , <i>Zeiraphera griseana</i>
	Yponomeutidae	<i>Yponomeuta evonymella</i> , <i>Yponomeuta malinella</i> , <i>Yponomeuta mayumivorella</i> , <i>Yponomeuta polystigmella</i> , <i>Yponomeuta tokyonella</i>	
Zygaenidae	<i>Illiberis pruni</i>		

Moscow, Novosibirsk, Primor'ye Kray, Ryazan, Sakhalin, Sankt Petersburg, Tomsk, Voronezhskaya, Yaroslavl), Serbia and Montenegro, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, Yugoslavia.

Region: Eastern Palaearctic, Oriental, Western Palaearctic.

5. *Cobunus pallidiolus* (Matsumura, 1912) 담색매파시벌 (Fig. 3A)

Ichneumon pallidiolus Matsumura, 1912: 235. Type: female; TD: HU.

Cobunus pallidiolus: Kim, 1955: 434; 1963: 78; 1970: 394; Lee et al., 2012: 40.

Diagnosis. Body reddish yellow. Face convex and clypeus flat. Antenna blackish brown in ventral view and reddish brown in dorsal view, with 41-42 flagellomeres. Epomia distinct.

Mesoscutum with weak notaulus. Mesoscutellum convex. Propodeum coarsely punctate with areola. Fore wing with areolet. Nervellus intercepted 1/3 of lower part; discoidella present. Metasoma densely punctate, with strong thyridium. 5-7 tergites black.

Material examined. 2 males, 2 females, Korea, GG, Pocheon-si, Korea National Arboretum, 26.v.2014, M.H. Kim (leg) (9-10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, *ditto*, (4-8.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 male, *ditto*, (20-25.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 male, 1 female, CB, Danyang-gun, Yeongchun-myeon, Namcheon-ri, Sobaeksan National Park, Namcheon valley, 23.v.2014, Y.J. Kim (leg) (6.vi.2014, ex. from a pupa of *Ivela auripes*) (YNU).

Table 2. Host records of *Apechthis rufata* (Gmelin) (Yu et al., 2012)

Order	Family	Scientific name	
Arachnida	Araneidae	<i>Araneus diadema</i> , <i>Araneus diadematus</i>	
Lepidoptera	Arctiidae	<i>Spilosoma lubricipedum</i>	
	Depressariidae	<i>Depressaria daucella</i>	
	Drepanidae	<i>Drepana falcataria</i>	
	Gelechiidae	<i>Anacamptis populella</i> , <i>Metzneria lappella</i>	
	Geometridae	<i>Abraxas grossulariata</i> , <i>Abraxas suspecta</i> , <i>Bupalus piniarius</i> , <i>Cyclophora linearia</i> , <i>Ennomos quercinaria</i> , <i>Idaea aureolaria</i> , <i>Operophtera brumata</i>	
	Lasiocampidae	<i>Dendrolimus pini</i> , <i>Macrothylacia rubi</i> , <i>Malacosoma neustria testacea</i>	
	Lycaenidae	<i>Artopoetes pryeri</i> , <i>Neozephyrus quercus</i> , <i>Satyrium iyonis</i>	
	Lymantriidae	<i>Ivela auripes</i> (new host record), <i>Calliteara pudibunda</i> , <i>Euproctis chrysoorrhoea</i> , <i>Leucoma salicis</i> , <i>Lymantria dispar</i> , <i>Lymantria monacha</i> , <i>Orgyia antiqua</i>	
	Noctuidae	<i>Acronicta euphorbiae</i> , <i>Lacanobia pisi</i> , <i>Mamestra brassicae</i> , <i>Nycteola degenerana</i>	
	Nolidae	<i>Bena prasinana</i>	
	Nymphalidae	<i>Aglais urticae</i> , <i>Argynnis paphia</i> , <i>Polygonia c-album</i>	
	Oecophoridae	<i>Carcina quercana</i> , <i>Diurnea fagella</i>	
	Pieridae	<i>Aporia crataegi</i> , <i>Gonepteryx rhamni</i> , <i>Pieris brassicae</i> , <i>Pieris napi</i> , <i>Pieris rapae</i>	
	Psychidae	<i>Megalophanes viciella</i>	
	Pyralidae	<i>Ortholepis vacciniella</i> , <i>Sitochroa verticalis</i>	
	Sphingidae	Sphingidae	<i>Sphinx ligustri</i>
		Tortricidae	<i>Adoxophyes orana</i> , <i>Aleimma loeflingiana</i> , <i>Archips oporana</i> , <i>Archips rosana</i> , <i>Archips rosana</i> , <i>Archips xylosteana</i> , <i>Choristoneura hebenstreitella</i> , <i>Choristoneura murinana</i> , <i>Choristoneura murinana</i> , <i>Hedya nubiferana</i> , <i>Pandemis cerasana</i> , <i>Pandemis corylana</i> , <i>Pandemis heparana</i> , <i>Ptycholoma lecheana</i> , <i>Ptycholomoides aeriferanus</i> , <i>Rhyacionia buoliana</i> , <i>Tortrix viridana</i> , <i>Tortrix viridana</i> , <i>Zeiraphera griseana</i>
Zygaenidae			<i>Zygaena trifolii</i>
Hymenoptera	Cephalidae	<i>Hartigia fumipennis</i> , <i>Hartigia xanthostoma</i>	
	Diprionidae	<i>Diprion pini</i> , <i>Neodiprion sertifer</i>	
	Ichneumonidae	<i>Hyposoter tricolor</i>	

Host: *Ivela auripes* (Butler) (Lepidoptera: Lymantriidae).

Distribution: Korea, India, Japan.

Region: Eastern Palearctic, Oriental.

Remark: *Ivela auripes* has been recorded as host of this species from several literatures (Uchida, 1930; Minamikawa, 1969; Kusigemati, 1987), and we confirmed this based on the results of the present study.)

6. *Apechthis capulifera* (Kriechbaumer, 1887) 황다리납작 뱀시벌 (Fig. 3B)

Pimpla capulifera Kriechbaumer, 1887: 113-121. Type: female; TD: ZSM.

Pimpla japonica Dalla Torre, 1902: 545-1141. Type:

unknown; TD: unknown.

Apechthis orbitalis Ashmead, 1906: 169-201. Type: female; TD: USNM.

Apechthis sapporoensis Ashmead, 1906: 169-201. Type: female; TD: USNM.

Apechthis japonica nigriorbitalis Uchida, 1928: 1-115. Lectotype: female; TD: HU.

Apechthis capulifera: Choi et al., 2015: 16.

Diagnosis. Body black. Face convex, with yellow line at inner margins of eyes. Clypeus flat, separated from face by groove. Antenna yellow at outer part and dark brown at inner part, with 27 flagellomeres. Epomia distinct. Pronotum glabrous centrally. Mesoscutum with weak notaulus. Mesoscutellum

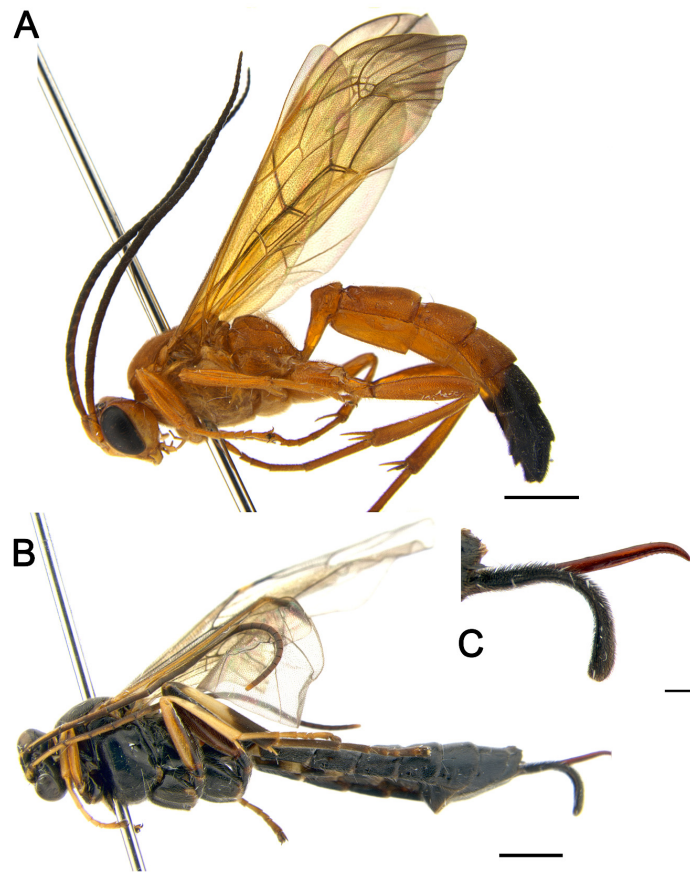


Fig. 3. *Cobunus pallidiolus* (A) & *Apechthis capulifera* (B-C). A. Habitus in lateral view, B. Habitus in lateral view, C. Ovipositor. Scale bars: A, B = 2 mm, C = 0.5 mm.

and postscutellum convex, yellow. Propodeum coarsely punctate except median part glabrous. Fore and mid legs yellowish brown except mid coxa black basally. Hind leg black except femur dark reddish brown, hind tibia with yellow band. Fore wing with areolet. Nervellus intercepted at 2/3 of upper part; discoidella present. Metasoma densely punctate, with strong thyridium. Ovipositor downcurved and dark reddish brown.

Material examined. 4 males, GG, Pocheon-si, Korea National Arboretum, 21.v.2014, Y.M. Shin, S.Y. Park (leg) (9-10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, 1 male, *ditto*, 26.v.2014, M.H. Kim (leg) (9-10.vi.2014, ex. from a pupa of *Ivela auripes*) (KNA); 1 female, CB, Danyang-gun, Yeongchunmyeon, Namcheon-ri, Sobaeksan National Park, Namcheon valley, 23.v.2014, Y.J. Kim (leg) (6.vi.2014, ex. from a pupa of *Ivela auripes*) (YNU).

Host: Host records of *A. capulifera* (Kriechbaumer) are summarized in Table 3.

Distribution: Korea, Austria, Azerbaijan, Belarus, Bulgaria, China (Gansu, Hebei, Heilongjiang, Henan, Hunan, Nei Menggu, -Shanxi, Sichuan), Taiwan, Czech Republic, Slovakia, Germany, Japan, Latvia, Norway, Poland, Romania, Russia (Amur, Astrakhanskaya, Buryatskaya Respublika, Irkutsk, Kaliningrad, Khabarovsk Krai, Krasnoyarsk Krai, Nizhegorodskaya, Novosibirsk, Primor'ye Krai, Sakhalin, Tambov, Yevreyskaya), Sweden, Switzerland, Ukraine.

Region: Eastern Palearctic, Oriental, Western Palearctic.

Remark: *Ivela auripes* has been recorded as host of this species (Minamikawa, 1969), and we confirmed this based on the results of the present study.

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Table 3. Host records of *Apechthis capulifera* (Kriechbaumer) (Yu et al., 2012)

Order	Family	Scientific name
Lepidoptera	Arctiidae	<i>Spilosoma lubricipedum</i>
	Nymphalidae	<i>Argynnis paphia</i> , <i>Brenthis ino</i> , <i>Brenthis ino tigrroides</i> , <i>Hestina japonica</i> , <i>Kaniska canace</i> , <i>Lethe diana</i> , <i>Libythea celtis</i> , <i>Libythea celtis celtoides</i> , <i>Libythea celtis lepita</i> , <i>Limenitis populi</i> , <i>Melanitis phedima</i> , <i>Neptis pryeri</i> , <i>Neptis rivularis</i> , <i>Neptis rivularis insularum</i> , <i>Vanessa indica</i>
		Lycaenidae
	Papilionidae	<i>Atrophaneura alcinous</i>
	Noctuidae	<i>Autographa gamma</i> , <i>Mamestra brassicae</i> , <i>Trichoplusia intermixta</i>
	Saturniidae	<i>Caligula japonica</i>
	Erebidae	<i>Euproctis chrysoorrhoea</i> , <i>Euproctis similis</i> , <i>Lymantria dispar</i> , <i>Lymantria monacha</i>
	Pieridae	<i>Aporia crataegi</i> , <i>Aporia japonica</i> , <i>Gonepteryx mahaguru</i> , <i>Gonepteryx rhamni</i> , <i>Pieris rapae crucivora</i>
	Lasiocampidae	<i>Malacosoma neustria testacea</i>
	Lymantriidae	<i>Ivela auripes</i>
	Geometridae	<i>Cystidia stratonice</i> , <i>Ourapteryx maculicaudaria</i>
	Papilionidae	<i>Papilio bianor maackii</i>
	Hesperiidae	<i>Polytremis pellucida</i> , <i>Pelopidas mathias</i>
	Tortricidae	<i>Cydia orobana</i> , <i>Tortrix viridana</i>
	Zygaenidae	<i>Zygaena filipendulae</i>
Coleoptera	Cerambycidae	<i>Saperda populnea</i>

Table 4. List of ichneumon wasps parasitizing of *Ivela auripes* from Korea

Subfamily	Scientific name	References
Ichneumoninae	<i>Cobunus pallidulus</i> (Matsumura, 1912)	Uchida, 1930
	<i>Apechthis capulifera</i> (Kriechbaumer, 1887)	Minamikawa, 1969
	<i>Apechthis rufata</i> (Gmelin, 1790)	New Host Record
Pimplinae	<i>Pimpla disparis</i> Viereck, 1911	New Host Record
	<i>Pimpla luctuosa</i> Smith, 1874	Minamikawa, 1969
	<i>Theronia atalantae</i> (Poda, 1761)	Minamikawa, 1969

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