

A new species of *Schlettererius* Ashmead from China, with a key to the species (Hymenoptera, Stephanidae)

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Abstract

A new species of *Schlettererius* Ashmead, 1900, *S. chundanae* **sp. n.**, is described and illustrated from China. The other East Palearctic species, *S. determinatorius* Madl, 1991, is redescribed and illustrated, the first host record is given and it is newly reported from China. A key to the species of the genus *Schlettererius* is included.

Keywords

Hymenoptera, Stephanidae, *Schlettererius*, new species, new record, China, key

Introduction

The small genus *Schlettererius* Ashmead, 1900 (Hymenoptera: Stephanidae) is Holarctic and contains two described species. The species were revised by Hong and Xu (2011) and Hong et al. (2011); a male from Qinling Mts (Shaanxi, NW China) was provisionally identified as *S. determinatorius* Madl, 1991. This species was described from Korea and is only known from the female holotype. Some differences were ob-

served, especially in the shape of the first tergite, but this could be the result of sexual dimorphism. Recently, one of us (JLT) collected a female in the Qinling Mts which obviously belongs to a new species. The earlier recorded male fits well with the new species and is considered to be conspecific. The biology is known only of the Nearctic *S. cinctipes* (Cresson, 1880) introduced into Tasmania from California for biological control of the introduced *Sirex noctilio* (Fabricius, 1793) (Hymenoptera: Siricidae; Taylor 1967; van Achterberg 2002). In this paper we report the East Palaearctic *S. determinatoris* Madl, 1991, from *Chrysobothris succedana* (Saunders) (Coleoptera: Buprestidae) in *Larix* sp. The new species is authored by the first two authors because they made the key and the formal description.

Material and methods

The studied specimens of the genus *Schlettererius* Ashmead belong to the collection of the Northwest University at Xi'an (NWUX), the Insect Museum, General Station of Forest Pest Management, Shenyang (GSFPM), the Parasitic Hymenoptera Collection of Zhejiang University at Hangzhou (ZJUH), the Naturalis Biodiversity Center at Leiden (RMNH) and the Hungarian Natural History Museum at Budapest (HNHM). The holotype of the new species is deposited in the collection of the College of Life Sciences, Northwest University at Xi'an.

The morphological terminology follows van Achterberg (2002). Observations and descriptions were made either under an Olympus SZ40 or an Olympus SZX11 stereomicroscope. Photographic images were made with an Olympus SZX12 motorized stereomicroscope combined with AnalySIS Extended Focal Imaging software and processed with Adobe Photoshop CS5, mostly to adjust the size and background. For the illumination a pair of 30W Megaman or 45W Jinsilai fluorescent lamps were used allowing easy observation of the sculpture of the specimens.

Taxonomy

Genus *Schlettererius* Ashmead, 1900

Figs 1–35

Schlettererius Ashmead, 1900: 150; Aguiar 2004: 75 (list of literature); Hong and Xu 2011: 71–73; Hong et al. 2011: 46–47. Type species (by monotypy and original designation): *Stephanus cinctipes* Cresson, 1880.

Diagnosis. Posterior part of pronotum more or less angled with remainder of pronotum (Figs 2, 13, 26); vein 1-M of fore wing distinctly curved (Figs 1, 12, 25); vein cu-a of hind wing present as pigmented vein (Figs. 12, 25); hind coxa with small subapical dorsal tooth (Figs 6, 35), but absent in *S. chundanae* (Fig. 23); hind tibia not distinctly

narrowed and compressed basally (Figs 5, 29); hind tarsus of female 5-segmented (Fig. 16); sternite of first metasomal tergite differentiated from its tergite (Figs 17, 30), first tergite 2.4–4.6 times as long as its apical width, not cylindrical, about as long as second tergite (Figs 4, 28), but distinctly longer in *S. chundanae* (Fig. 15); second tergite sessile and smooth or slightly sculptured basally (Figs 4, 28); posterior part of eighth metasomal tergite of female with distinct pygidial process (Figs 4, 11, 24); ovipositor sheath with wide ivory subapical band (Figs 10, 11, 22, 24, 34).

Distribution. Nearctic, East Palearctic and Australian (only Tasmania: introduced for biological control of introduced Siricidae).

Key to species of the genus *Schlettererius*

- 1 Posterior part of pronotum steeply elevated above anterior part of pronotum (Fig. 2); second-third tergites yellowish brown (Fig. 4); ovipositor sheath of female with subapical whitish band about 3.5 times as long as apical blackish part (Fig. 10); Nearctic, Australian ***S. cinctipes* (Cresson, 1880)**
- Posterior part of pronotum moderately elevated above anterior part of pronotum (Figs 13, 26); second-third metasomal tergites black or dark brown (Figs 11, 24); subapical ivory band of ovipositor sheath of female 1.7–1.8 times as long as its apical blackish part (Figs 22, 34); Palearctic **2**
- 2 Length of first metasomal tergite about twice (♀) its maximum width (Fig. 28); hind coxa largely smooth (except some short striae) and with a small (in lateral view acute) subapical dorsal tooth (Figs 29, 35); in dorsal view head slightly widened behind eyes (Fig. 31); first metasomal segment wide in lateral view (Fig. 30) ***S. determinatoris* Madl, 1991**
- Length of first tergite 3.8–4.6 times (♀♂) its maximum width (Fig. 15); hind coxa with strong and sparse rugae, and without dorsal tooth (Figs 18, 23); in dorsal view head parallel-sided behind eyes (Fig. 19); first segment narrow in lateral view (Fig. 30) ***S. chundanae* sp. n.**

Schlettererius chundanae Tan & van Achterberg, sp. n.

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Figures 11–23

Schlettererius determinatoris(u)s; Hong and Xu 2011: 71–73 (only male); Hong et al. 2011: 46–47, 103–104 (only male).

Type material. Holotype, ♀ (NWUX): “NW. **China:** Shaanxi, Guanghuojie, Qinling Mts, c. 1000 m, 27.vi.2013, Jiangli Tan, NWUX”. Paratype: 1 ♂ (ZJUH): “[China:] Shaanxi, Liuba, Mt. Zibai, 1632 m, 4.viii.2004, Zhang Hong-ying, No. 20047080”.

Diagnosis. Head in dorsal view parallel-sided behind eyes (Fig. 19); posterior half of pronotum comparatively low and dorso-posteriorly finely transversely rugose (Fig.

13); first subdiscal cell of fore wing comparatively robust and 2.0–2.5 times longer than wide (Fig. 12); hind coxa with strong and sparse rugae, and without dorsal tooth (Figs 18, 23); first-third metasomal tergites black or dark brown (Fig. 11); first metasomal segment narrow in lateral view (Fig. 30); first tergite 3.8–4.6 times (♀ ♂) as long as its maximum width and irregularly coarsely transversely rugose (Fig. 15).

Description. Holotype, female, length of body 12.4 mm, and of fore wing 9.2 mm.

Head. Antenna with 30 segments; frons coarsely obliquely rugose; three anterior coronal teeth large and acute, both posterior ones arcuate and lamelliform, with two small lobe-shaped carinae on each side in front of both posterior ocelli; behind level of coronal area having four curved, progressively smaller carinae followed by rugose area, rugae rather coarse, posteriorly narrowly reaching occipital carina and widely smooth laterally; temple non-angulate (Fig. 19), punctulate but largely smooth and shiny.

Mesosoma. Neck short and robust, transversely rugose, neck at much lower level than middle part of pronotum (Fig. 14); middle part of pronotum largely smooth and without a distinct carina posteriorly; propleuron with sparse large punctures, shiny and rather densely setose; mesonotum irregularly foveolate and area between smooth; notauli and median groove distinct; scutellum with some coarse punctures medially, foveolate laterally; axillae coarsely punctate; mesopleuron distinctly convex, convex part foveolate-punctate and covered with long whitish setae, medially convex part of metapleuron rugose and with long whitish setae, anteriorly crenulate and intermediate area smooth; propodeum densely irregularly rugose (Fig. 14).

Wings. Fore wing (Fig. 12): vein 1-M 3.4 times as long as vein 1-SR and curved; vein r ends slightly before level of apex of pterostigma; first subdiscal cell robust, 2.2 times as long as its maximum width, vein cu-a entirely pigmented.

Legs. Hind coxa robust, without tubercle dorsally and with strong and sparse rugae (Figs 18, 23); hind femur widened, sparsely punctate and with whitish setae ventrally and dark brown setae dorsally, area in between punctures smooth and shiny, ventrally with 3 large acute teeth (the anterior one much smaller than posterior ones) and several denticles in between (Fig. 16); hind tibia 1.3 times as long as hind femur, basal narrow part of hind tibia about 0.8 times as long as widened part, widened part ventrally distinctly obliquely carinate; hind basitarsus subparallel-sided, length of hind basitarsus 3.7 times as long as wide and 1.3 times as long as second tarsal segment.

Metasoma. First tergite 3.8 times as long as its maximum width (Fig. 15), 1.2 times as long as second tergite and 0.4 times as long as metasoma without first tergite, sub-cylindrical, distinctly transversely rugose, but medially irregularly rugose; base of second tergite finely sparsely rugose; remainder of tergites smooth and shiny; setose part of ovipositor sheath 1.7 times as long as body and 2.3 times as long as fore wing.

Colour. Black or blackish brown; tegula and palpi dark brown; scapus, pedicellus, malar space, mandible and patch near basal quarter of hind tibia partly brown; base of femora and of fore and middle tibiae and tarsi pale yellowish brown; remainder of fore and middle tibiae brown; veins and pterostigma largely dark brown, but base of pterostigma ivory; wing membrane slightly brownish but fore wing darkened near vein r and below parastigma; subapical ivory band of ovipositor sheath 1.9 times as long as apical blackish part (Fig. 22).

Male. See Hong et al. (2011) for a detailed description. It has the first tergite 4.6 times as long as its maximum width.

Distribution. Palaearctic: China (Shaanxi).

Etymology. Named after Ms Chundan Hong (Guangzhou), who revised the Chinese species of the Stephanidae.

Schlettererius cinctipes Cresson, 1880

Figures 1–10

Stephanus cinctipes Cresson, 1880: xviii.

Schlettererius cinctipes; Ashmead 1900: 150; Aguiar 2004: 75 (list of literature); Hong and Xu 2011: 71–73; Hong et al. 2011: 46–47.

Diagnosis. Posterior part of pronotum steeply elevated above its anterior part (Fig. 2); first metasomal tergite irregularly transversely rugose and about twice as long as its apical width (Fig. 4); second and third tergites yellowish brown (Fig. 4); subapical ivory band of ovipositor sheath of female about 3.5 times as long as apical blackish part (Fig. 10).

Distribution. Nearctic. Introduced in the Australian region (Tasmania).

Schlettererius determinatoris Madl, 1991

Figures 24–35

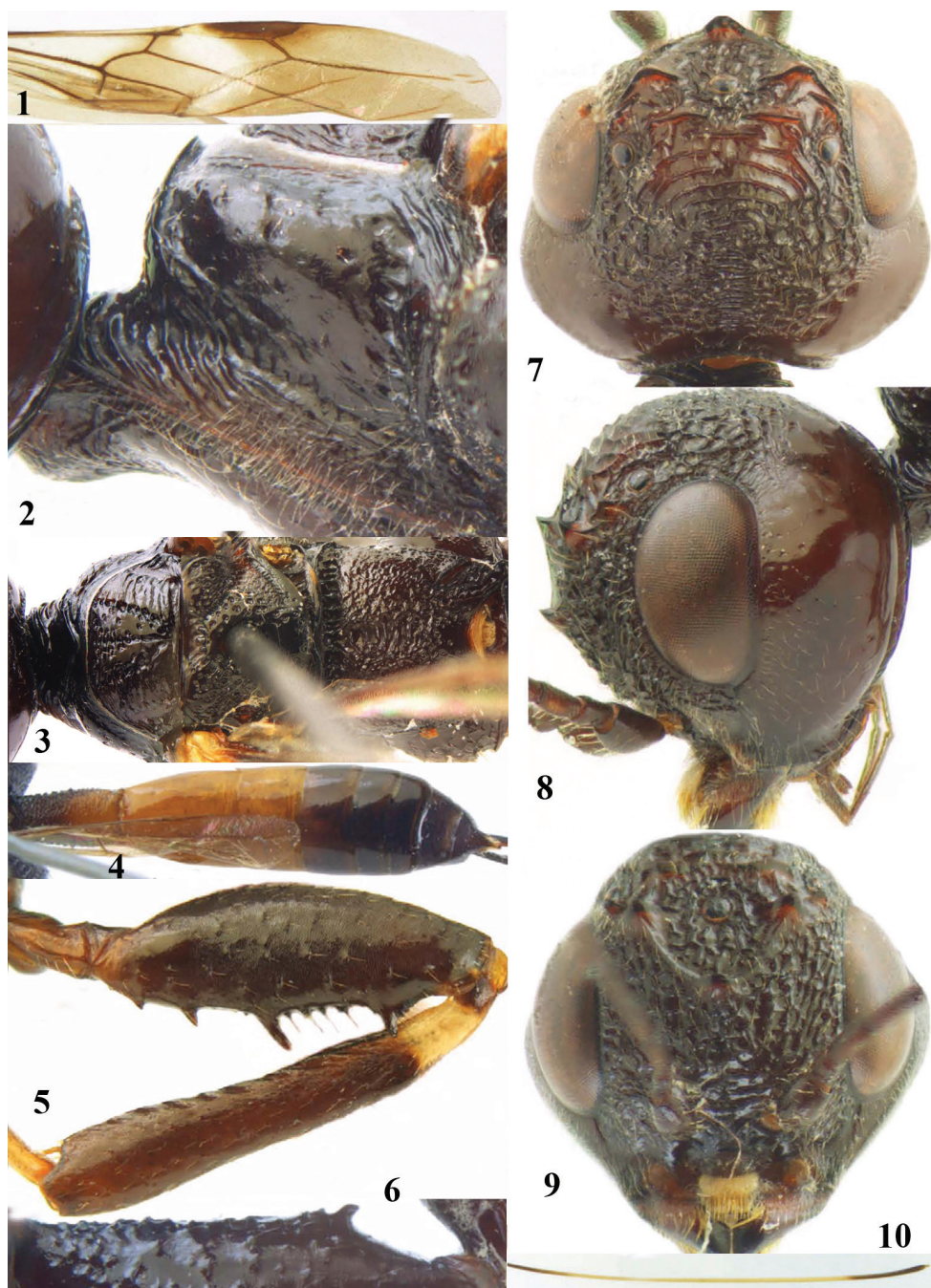
Schlettererius determinatoris Madl, 1991: 119–120; Belokobylskij 1995: 18; van Achterberg 2002: 198; Aguiar 2004: 75; Hong and Xu 2011: 71–73; Hong et al. 2011: 46.

Schlettererius determinatorius; Hong et al. 2011: 46, 103–104 (*lapsus*).

Type material. Holotype, ♀ (HNHM), “Korea, Prov. North Pyongan, Mt. Myohyang-san”, “17.07.1982, No.815, leg. Dr. L. Forró & Dr. L. Ronkay”, “Holotypus ♀ *Schlettererius determinatoris* n. sp. Madl, 1990”, “OSUC 21616”.

Additional material. 2 ♂ (GSFPM), “China: Liaoning, Kuandian Dandong, 21.v.2009, ex *Chrysobothris succedana* (Saunders) (Buprestidae) in *Larix* sp., Xiao-yi Wang”.

Diagnosis. Head in dorsal view slightly widened behind eyes (Fig. 31); posterior half of pronotum moderately low and dorso-posteriorly finely transversely rugose (Figs 26, 27); first subdiscal cell of fore wing comparatively robust and about 2.5 times longer than wide (Fig. 25); hind coxa largely smooth (except some short striae) and with a small (in lateral view acute) subapical dorsal tooth (Figs 29, 35); first metasomal tergite irregularly transversely rugose and about 2.4 times as long as its apical width (Fig. 28); first metasomal segment wide in lateral view (Fig. 30); second-third tergites blackish or dark brown (Fig. 24); subapical ivory



Figures 1–10. *Schlettererius cinctipes* (Cresson), female, U.S.A. **1** fore wing **2** pronotum lateral **3** mesosoma dorsal **4** metasoma dorsal **5** hind femur and tibia lateral **6** hind coxa lateral **7** head dorsal **8** head lateral **9** head anterior **10** apex of ovipositor sheath. Modified after Hong et al. (2011).

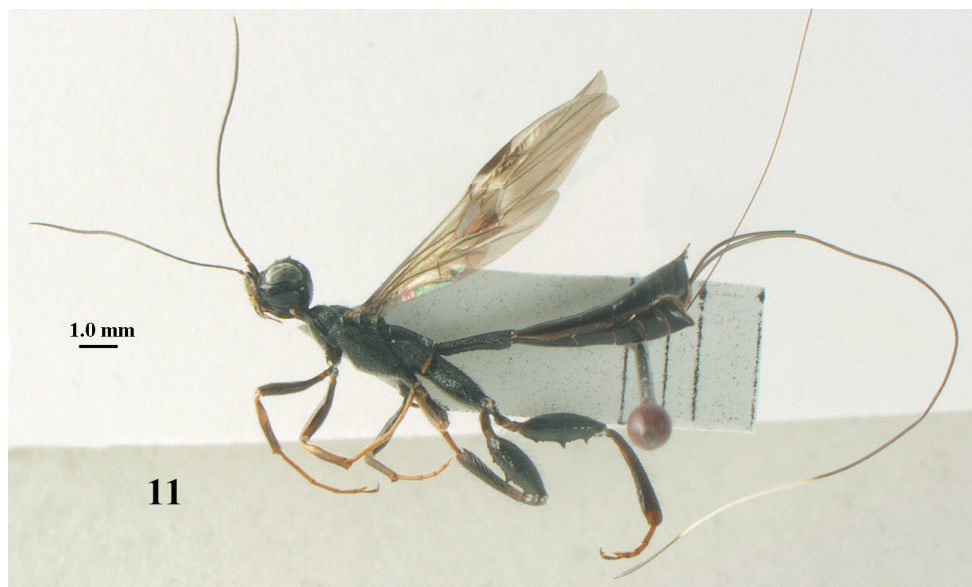


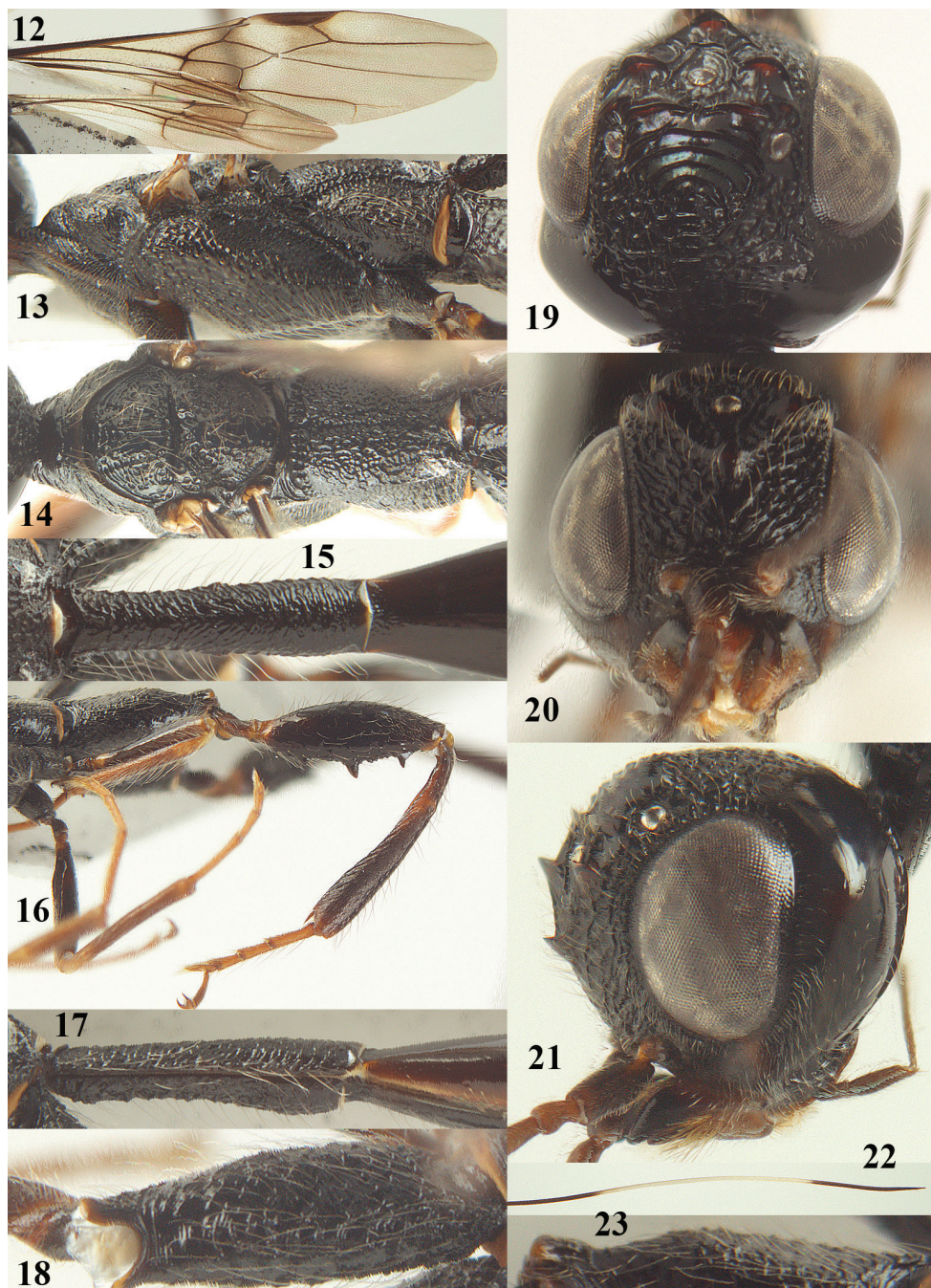
Figure 11. *Schlettererius chundanae* sp. n., female, holotype, habitus lateral.

band of ovipositor sheath of female about 1.7 times as long as apical blackish part (Figs 24, 34).

Description. Holotype, female, length of body 15.0 mm, and of fore wing 9.9 mm.

Head. Antenna with 29 (right) or 30 (left) segments; frons (Fig. 32) coarsely transversely rugose anteriorly and remainder reticulate-rugose; three anterior coronal teeth large and rather acute, both posterior ones arcuate and lamelliform, with one small lobe-shaped carina on each side in front of both posterior ocelli; behind coronal area with five curved, progressively smaller carinae followed by rugae laterally and fine transverse carinae medially, remaining narrowly separated from occipital carina (Fig. 31); temple smooth and shiny except for some small punctures near eye, slightly widened behind eyes and rather rounded in dorsal view (Fig. 31).

Mesosoma. Neck (Figs 26, 27) short and stout, anteriorly with 3 lamelliform carinae; middle and oblique part of pronotum largely smooth and with a distinct, sinuate carina medio-posteriorly and obliquely striate laterally; posterior part of pronotum medio-dorsally smooth and laterally indistinctly rugose; lateral oblique groove of pronotum rather narrow and smooth, but anteriorly with some crenulae; propleuron coriaceous laterally, smooth (except some punctures) and shiny ventrally; mesonotum irregularly and sparsely foveolate medially and area between fovea smooth, laterally transversely striate (Fig. 27); notauli and median groove shallow, crenulate; scutellum largely smooth medially, foveolate laterally (Fig. 27); axillae rugose-foveolate; mesopleuron strongly convex, convex part rugose-foveolate and covered with greyish se-



Figures 12–23. *Schlettererius chundanae* sp. n., female, holotype. **12** wings **13** mesosoma lateral **14** mesosoma dorsal **15** first metasomal tergite dorsal **16** hind leg lateral **17** first tergite lateral **18** hind coxa dorsal **19** head dorsal **20** head anterior **21** head lateral; **22** apex of ovipositor sheath; **23** detail of hind coxa lateral.

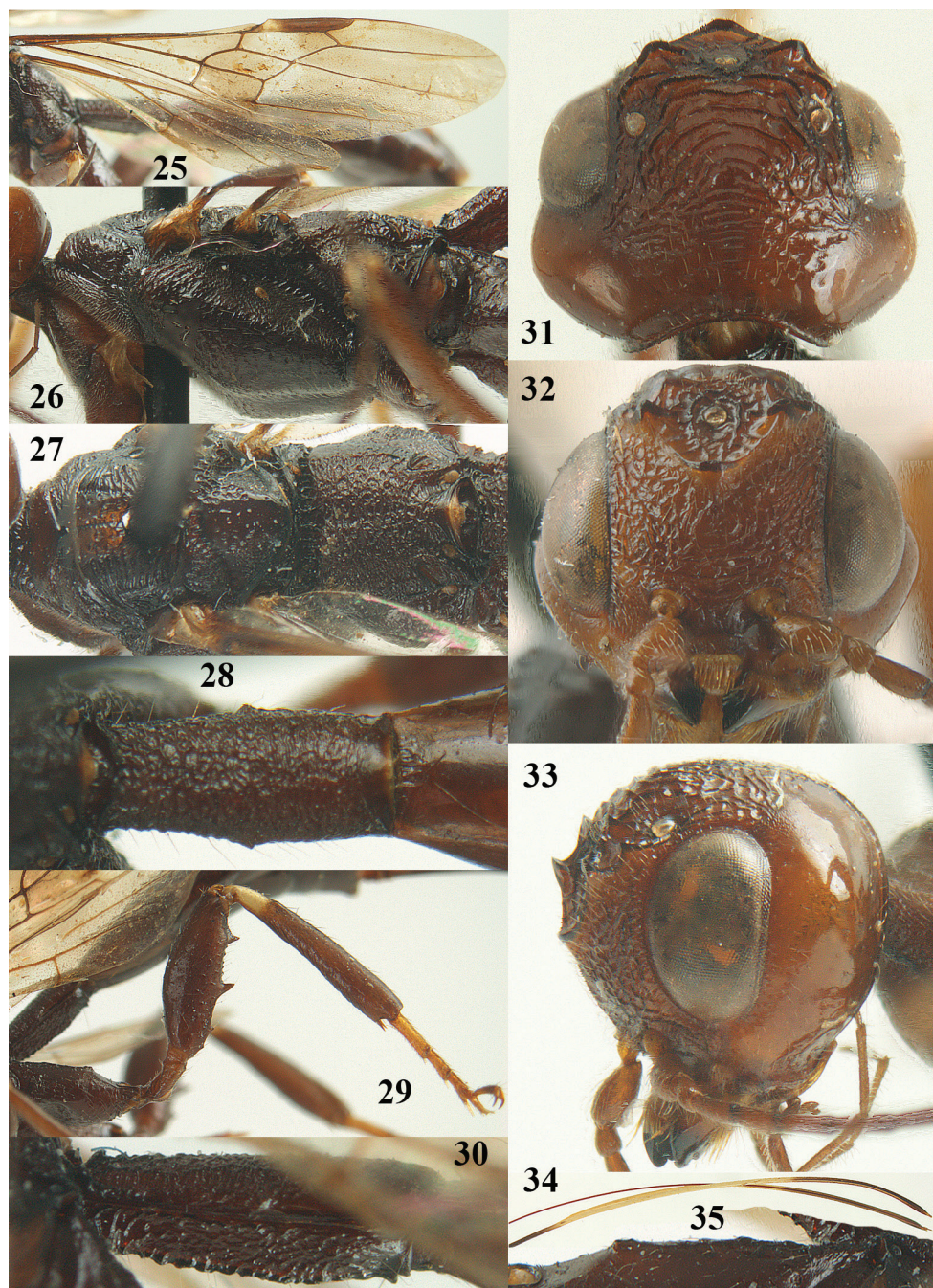


Figure 24. *Schlettererius determinatoris* Madl, female, holotype, habitus lateral.

tae, flat dorso-posterior part superficially rugose; mesosternum anteriorly superficially rugose-punctate and posteriorly coriaceous and laterally sparsely punctate; medial convex part of metapleuron coarsely rugose and with short greyish setae, antero-ventrally weakly crenulate, with antero-dorsal depression deep and antero-ventral depression less impressed; propodeum densely finely and irregularly rugose (Fig. 27).

Wings. Fore wing (Fig. 25): vein 1-M strongly curved and 2.4 times as long as vein 1-SR; vein r ends before level of apex of pterostigma; first subdiscal cell robust, 1.8 times as long as its maximum width.

Legs. Hind coxa stout, largely smooth, with some short striae and with a small (in lateral view acute) subapical dorsal tooth (Figs 29, 35); hind femur moderately slender, finely granulate and covered with sparse whitish setae, ventrally with 3 acute teeth (the basal one small) and some small teeth (denticles; Fig. 29); hind tibia 1.2 times as long as hind femur, basal narrow part of hind tibia 0.6 times as wide as widened part and with long ventral carina, widened part ventrally distinctly obliquely carinate (Fig. 29); length of hind basitarsus 3.6 times as long as wide.



Figures 25–35. *Schlettererius determinatoris* Madl, female, holotype. **25** wings **26** mesosoma lateral **27** mesosoma dorsal **28** first metasomal tergite dorsal **29** hind leg lateral **30** first tergite lateral **31** head dorsal **32** head anterior **33** head lateral; **34** apex of ovipositor sheath; **35** detail of hind coxa lateral.

Metasoma. First tergite stout, sub-cylindrical, 2.1 times as long as its maximum width and about 2.4 times as long as its apical width (Fig. 28), irregularly transversely rugose, posteriorly less developed than anteriorly, laterally with whitish setae; second tergite slightly shorter than first tergite and smooth except some short crenulae medio-anteriorly (Fig. 28); remainder of tergites smooth and shiny; ovipositor sheath 1.9 times as long as body and 2.9 times as long as fore wing.

Colour. Dark brown; head, scapus, pedicellus, fore leg (but tibia ivory basally), middle and hind tarsi and propleuron brown; malar space pale brown; wing membrane (but basally and area below base of pterostigma subhyaline) infusate; all tibiae ivory basal band; subapical ivory band of ovipositor sheath of female about 1.7 times as long as apical blackish part (Fig. 34).

Male. Very similar to female, length of fore wing 10.0–10.2 mm, and of body 16–17 mm; both with 29 antennal segments and first tergite 2.4–2.5 times its apical width.

Distribution. Palaearctic: Korea, China (new record).

Biology. *Chrysobothris succedana* (Saunders) (Buprestidae) in *Larix* sp.

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References

- Achterberg C van (2002) A revision of the Old World species of *Megischus* Brullé, *Stephanus* Jurine and *Pseudomegischus* gen. nov., with a key to the genera of the family Stephanidae (Hymenoptera: Stephanioidea). Zoologische Verhandelingen Leiden 339: 1–206.
- Aguiar AP (2004) World catalog of the Stephanidae (Hymenoptera: Stephanioidea). Zootaxa 753: 1–120.
- Ashmead WH (1900) Classification of Ichneumon Flies. Proceedings of the United States National Museum 23(1206): 1–220. doi: 10.5479/si.00963801.23-1206.1

- Cresson ET (1880) Monthly proceedings. Transactions of the American Entomological Society 8: xvii–xviii.
- Fabricius JC (1793) Entomologia systematica 2. Hafniae, 1–519.
- Hong CD, Achterberg C van, Xu ZF (2011) A revision of the Chinese Stephanidae (Hymenoptera, Stephanoidea). ZooKeys 110: 1–108. doi: 10.3897/zookeys.110.918
- Hong CD, Xu ZF (2011) A newly recorded genus and species of Family Stephanidae (Hymenoptera, Stephanoidea) from China. Entomotaxonomia 33(1): 71–73.
- Madl M (1991) Zur Kenntnis der paläarktischen Stephanidae (Hymenoptera, Stephanoidea). Entomofauna 12: 117–126.
- Taylor KL (1967) Parasitism on *Sirex noctilio* F. by *Schlettererius cinctipes* (Cresson) (Hymenoptera: Stephanidae). Journal of the Australian Entomological Society 6: 13–19. doi: 10.1111/j.1440-6055.1967.tb02132.x