

## New Combination of *Pararrhynchium paradoxum koreanum* (Hymenoptera: Vespidae: Eumeninae)

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### ABSTRACT

An eumenid subspecies *Pararrhynchium paradoxum koreanum* Giordani Soika, 1986 is newly combined to the genus *Pseudepipona* de Saussure, 1856. Although tegula of this subspecies is similar to one of *Allodynerus*, shape of scutellar crest and related structures in both sexes and peculiar shape of mandible in male are critically justifiable for the genus *Pseudepipona*. This form is a discrete species in the genus, thus named as *Pseudepipona koreanum* (Giordani Soika, 1986) n. comb. The original description of this species was based on the sole male specimen and hardly diagnostic, just providing coloration compared with the nominotypical subspecies of *P. paradoxum*. A redescription of males and description of the hitherto unknown female are provided.

**Keywords:** *Pseudepipona koreanum*, *Allodynerus*, description, Korea

### INTRODUCTION

The subspecies *Pararrhynchium paradoxum koreanum* Giordani Soika, 1986 (Hymenoptera: Vespidae: Eumeninae) was described based on a male specimen from Suwon, Gyeonggi-do, South Korea. Although the examination of the holotype allowed Kim and Yamane (2007) to recognize the clear misidentification of this subspecies (even in generic allocation), its taxonomic position was left unsolved for future study. This subspecies is a member of genera that have sessile metasomal segment 1 lacking basal transverse carina, while members of the genus *Pararrhynchium* have a well-developed transverse carina on metasomal segment 1.

The author has accumulated materials of this form in Korea, and concluded that it is an unknown species of the genus *Pseudepipona* de Saussure, 1856.

In this study, *Pararrhynchium paradoxum koreanum* Giordani Soika, 1986 is newly combined as *Pseudepipona koreanum* (Giordani Soika, 1986). The male description is complemented, and the hitherto unknown female is described. The genus *Pseudepipona* is first documented for the Korean fauna.

### SYSTEMATIC ACCOUNTS

Order Hymenoptera Linnaeus, 1758

Family Vespidae Linnaeus, 1758

Subfamily Eumeninae Latreille, 1802

<sup>1</sup>\*Genus *Pseudepipona* de Saussure, 1856: 309. Type species: *Odynerus herrichii* de Saussure, 1856, monotypy.

<sup>2</sup>\**Pseudepipona koreanum* (Giordani Soika, 1986) n. comb. *Pararrhynchium paradoxum koreanum* Giordani Soika, 1986: 143, ♂ (holotype), Korea: "suigen" (Smithsonian Institute, USNM).

**Note for allocation of the genus.** According to Giordani Soika (1978), Guichard (1980), and Tan et al. (2018), this species falls within members of the genus *Pseudepipona* or *Allodynerus* by the combination of following characteristics: metasoma and metasomal segment 1 sessile, metasomal segment 1 not strongly slenderer than segment 2, and metasomal segment 1 broader than long in dorsal view; tegula protruding posteriorly, emarginate or truncate adjoining parategula; pretegular carina well-developed; anterior face of pro-

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notum smooth, without deep pits or foveae; epicnemial carina well-developed in male, but sometimes evanescent in lower part in female; axillary fossa in dorsal view at least oval, not slit-like; metanotum dorsally or apico-laterally not distinctly toothed; propodeal valvula mono-lamellate, with an upper bordering transverse carina.

In the shape of tegula, this species is likely to be a member of the genus *Allodynerus* rather than one of *Pseudepipona*. Tegula is narrower and longer, strongly processed posteriorly, and of which end distinctly surpassing parategula in the former, while shorter and broader (broadened at mid-length) and of which posterior end at most reaching the end of parategula (Tan et al., 2018). The tegula of this species is narrow and long in shape without clear broadening at mid-length. Comparing with the Korean species of *Allodynerus* (*A. delphinialis* and *A. mandshuricus*), it is just less narrower and longer and its posterior end is less surpassing the parategula.

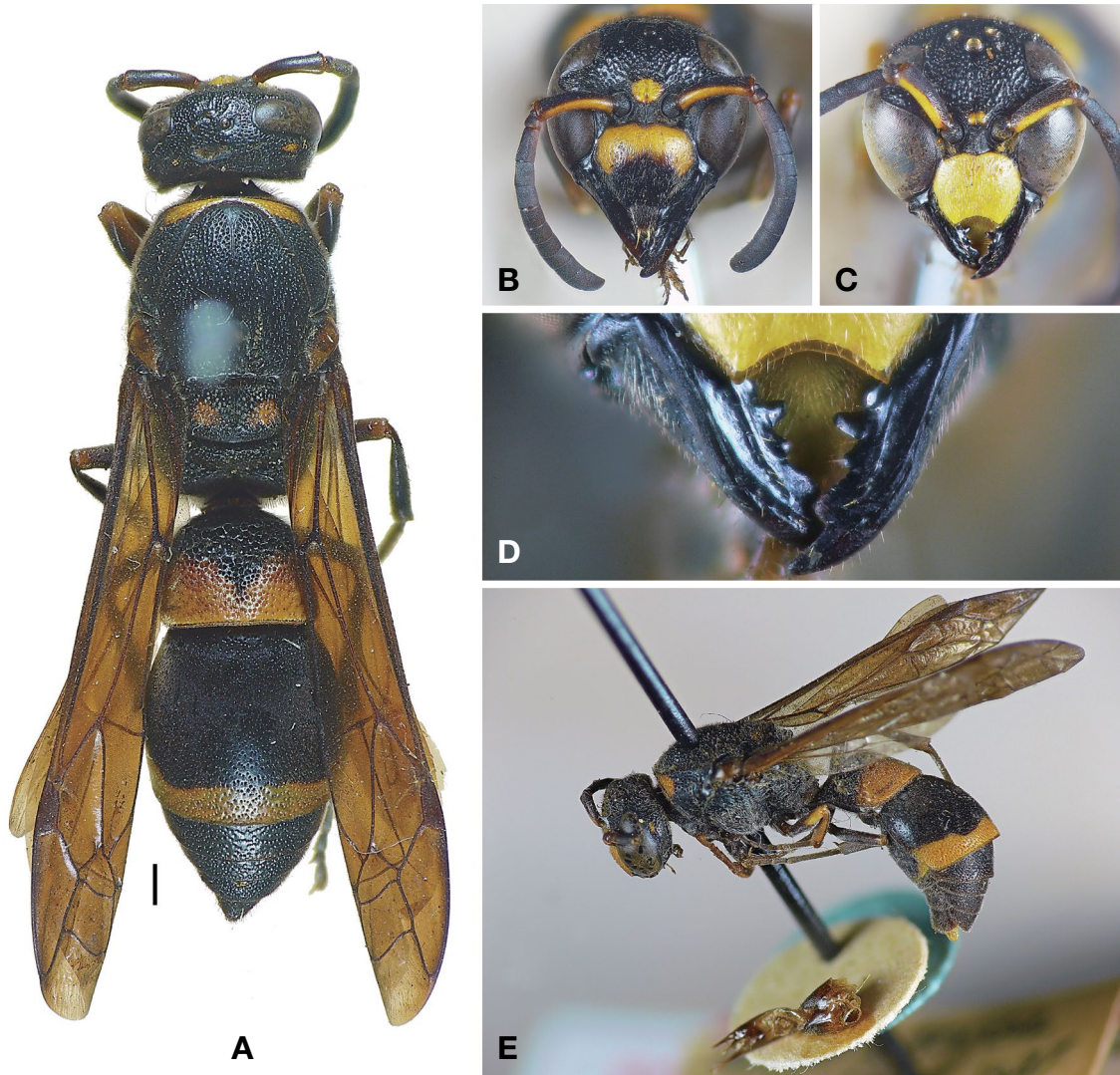
On the other hand, the shape and orientation of scutella crest, transcutella carina and axillary fossa are clearly as those of the latter. This species has large round to oval axillary fossa in the almost anterior half of the lateral plate of scutellum (thus the scutellar crest narrower) and narrow sharp transcutellar carina. But the axillary fossa is very small round (almost a pit-like), and the scutellar crest is very wide in the species of *Allodynerus* (Korean species examined and European species dating from Giordani Soika, 1978, Guichard, 1980, and Kurzenko, 1995).

Carpenter and Cumming (1985) wrote “The form of the tegula is of great importance in eumenine taxonomy, but interpretation of it has never been clear”. Such seems to be the case of generic allocation of this species. With those characteristics of axillary fossa and related structures more stressed in separation of those two genera by Giordani Soika (1978), Guichard (1980), and Kurzenko (1995), presence of a clear tooth formed at mid-point of propodeal carina (Tan et al., 2018) in both sexes and sub-basal inner emargination of male mandible which is never shown in *Allodynerus* (the emargination of this species is aberrant from typical one as fig. 18 and fig. 141-8 in Carpenter and Cumming, 1985 and Kurzenko, 1995, respectively, which is likely to be a species specific; detailed structure is in the below description and Fig. 1D), I newly combine this species with the genus *Pseudepipona*.

**Material examined.** South Korea: ♂, “Suigen” [Gyeonggi-do, Suwon], 21 May 1927, Gardner TR (holotype); ♀, Gyeonggi-do: Pocheon-si, Mt. Wangbansan, 5 Jun 1977, Lee WH; ♀, Gyeongsangbuk-do: Mungyeong-si, Gwaneum-ri, 18 Jul 1986, Jeong MS; ♀, Gyeonggi-do: Suwon-si, Seodun-dong, 26 Jun 1991, DJK; ♀, Gangwon-do: Wonju-si, Maeji-ri, Yeonse Univ. Campus, 3 Jun 1997, Kim MS, Kim KJ; ♂, ditto, 25 May 2006; ♀, Gangwon-do: Inje-gun, Jogyeongdong, Mt. Bangtaesan, 19 Jun 1998, Kim JK; ♂,

Gyeonggi-do: Anseong-si, Juksan-myeon, Chiljangsa, 22 Jun 2009, Kim JK.

**Description.** Female (Fig. 1A, B): Body length 12.5–17.0 mm (Fig. 1A). Head: Subcircular in frontal view, slightly broader than long. Posterolateral margins of lateral ocelli furrowed. Cephalic fovea somewhat deeply excavated, large (slightly broader than ocellar region), with a pair of pits separated by ocellus diameter; of which posterior part with fine compact transverse striae. Clypeus convex, most swollen at basal one-third, and remainder lower part declivous, approximately 1.20 times as broad as long; its apical emargination shallow (but forming triangular apico-lateral teeth), and distance between apical teeth slightly longer than inter-antennal distance. Occipital carina well developed on genal area, but weakened on vertex area (almost lost dorsally); posterior margin of gena along occipital carina deeply furrowed, equipped with weak longitudinal carinae regularly set. Mesosoma: Pronotal carina well developed. Mesonotum posteriorly with a pair of notaulices broadened posteriad and as long as parapsidal lines. Tegula 1.8 times as long as broad; posterior end not pointed (rounded) and slightly exceed parategula end. Epicnemial carina obsolete. Scutellum more or less swollen, distinctly higher than posterior margin of mesonotum, with a median longitudinal impressed line; trans-scutal sulcus deep and long, longer than ocellus diameter, with more or less regular longitudinal carinae at bottom. Metanotum sloping; trans-metanotal sulcus very deep, long (slightly longer than ocellus diameter), imbricate at bottom. Propodeal submedian carina on propodeum well developed, not linear but undulate due to interruption of foveae, and not forming distinct processes in upper median part of propodeum. Wing: Fore wing length ca. 14 mm, fuscous almost entirely. Metasoma: Metasomal tergum 1 1.4 times as broad as long, anterior margin broadly round in dorsal view, ca. 0.6 times as broad as tergum 2; apical lamella very short, almost absent. Tergum 2 in dorsal view slightly longer than broad. Apical lamellae of terga 2, 3 wide, and slightly bent upward. Sculpture: Frons punctate-reticulate. Clypeus in lower two-thirds longitudinally rugous-partially imbricate, upper one-third with sparse punctures. Vertex and gena moderately to densely punctate. Pronotum moderately to densely punctate, interspaces dully ridged in dorso-sublateral parts; lower lateral face more or less strongly carinate-sparsely punctate. Mesoscutum in anterior half moderately punctate, interspaces dully ridged; area between notaulus very sparsely punctate. Entire face of scutellum punctate-reticulate. Metanotum foveate-reticulate. Dorsal mesepisternum obliquely ridged-sparsely punctate; ventral mesepisternum moderately to densely punctate. Metapleuron striate. Propodeal dorsum and lateral face foveate-reticulate, interspaces in lower half of propodeal lateral face imbricate-striate; propodeal concavity dully reticulate-imbri-



**Fig. 1.** *Pseudepippona koreanum*. A, General habitus, female, in dorsal view; B, Head, female, in frontal view; C, Head, male, in frontal view; D, Mandible, male; E, General habitus of holotype of *Pararrhynchium paradoxum koreanum*, male, in lateral view. Scale bar: A=1 mm.

cate. Anterior half of tergum 1 foveate-reticulate, remainder posterior portion densely to moderately punctate (getting sparser posteriorly); tergum 2 moderately punctate, punctures distinctly smaller than those on tergum 1, and sparsest in dorso-medial part; remainder terga with moderate to dense punctures. Coloration (Fig. 1A, B): Body black and maculation more or less extensive. Following parts/markings deep yellow: antennal scape below, basal one-third of clypeus (laterally expanding), roundish inter-antennal marking, small oval marking in upper gena, pronotal dorsum, anterior and posterior parts of tegula, paired spots on scutellum, strongly biconvex marking in posterior half of tergum 1 (upper part of marking ferruginous), and apical band on tergum 2, ante-

rior faces of femur, tibia, and basitarsus of fore leg. Tegula medially brown.

Male (Fig. 1C–E). Structurally as in female except for following details. Body length ca. 9 mm. Clypeus very feebly punctate, 1.8 times as broad as long; apical emargination deeper and broader than female, and distance between apical teeth slightly less than twice as long as inter-antennal distance. Mandible five-teethed, basal tooth truncate apically, apical three obliquely oriented, but subbasal one vertical; median tooth smallest, so that forming large space between subbasal and subapical tooth, appearing an emargination with a tooth (Fig. 1D). Terminal segment of antenna recurved, of which end reaching apex of flagellomere 8, not strongly taper-

ing and pointed apically, more or less cylindrical. Epicnemial carina well-developed. Mesoscutal punctures denser, almost punctate-reticulate. Submedian carina of propodeum clearly developed, propodeal concavity densely striate. Fore wing length ca. 10 mm. In addition to markings seen in female, entire clypeus and labrum yellow, but markings on scutellum lacking in non-type materials treated herein and apical marking on tergum 1 less convex.

**Distribution.** South Korea: Gyeonggi-do, Gangwon-do, Gyeongsangbuk-do.

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## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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