

# Additions to the knowledge of the genus *Eumenes* Latreille, 1802 from China (Hymenoptera, Vespidae, Eumeninae)

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## Abstract

In this paper one new species namely *Eumenes ferruapiculus* **sp. nov.**, from Yunnan (China) is described and illustrated in detail. In addition, *E. affinis* de Saussure, 1852, *E. aquilonius* Yamane, 1977, *E. belli* Giordani Soika, 1973, *E. gibbosus* Nguyen, 2015, and *E. rubrofemoratus* Giordani Soika, 1941 are newly recorded from China. An updated key to the Chinese species of the genus *Eumenes* is provided.

## Keywords

China, *Eumenes*, Eumeninae, Hymenoptera, new record, new species

## Introduction

The genus *Eumenes* Latreille, 1802 with 107 species and 43 subspecies is one of the largest genera of the subfamily Eumeninae, widely distributed in the Palearctic, Oriental, Australian, Ethiopian, Nearctic and Neotropical regions (Girish Kumar et al. 2017). In early studies on the genus *Eumenes*, Giordani Soika (1940, 1941, 1960), Yamane (1977a, b), Kim and Yamane (2001) researched and made some revisions of the genus from Far East Asia. Then, Nguyen (2015) and Girish Kumar et al. (2017) reviewed it from Vietnam and India, respectively. In our study on the genus *Eumenes*

from China, Zhou et al. (2012) described two new species of *Eumenes* and provided a key to ten species in this genus from Southwestern China, but did not include all the known species yet. In our follow-up study of Chinese eumenids, a total of 31 species and 7 subspecies of the genus *Eumenes* were recognized, containing one new species and five new records. In the present paper, the new species is described and illustrated in detail, and the new records are provided with diagnoses and illustrations. Based on the specimens and related literature, a key to all the known Chinese species of *Eumenes* is given.

## Material and method

Examined specimens are deposited in the Institute of Entomology and Molecular Biology, Chongqing Normal University, Chongqing, China (CNU). Descriptions and measurements were made under a Nikon SMZ1500 stereomicroscope, and all figures were taken with a Leica EX4HD stereomicroscope attached to a computer using the Leica Application Suite version 2.1.0 software. Body length was measured from the anterior margin of the head to the posterior margin of metasomal tergum 2. For the density description of punctures, “sparsely” means that interspaces are larger than one puncture diameter, “moderately” means equal to the diameter, and “densely” means less than one diameter. The abbreviations used in the text are as follows: A (1, 2, ...) for antennal segments, T (1, 2, ...) for metasomal terga, S (1, 2, ...) for metasomal sterna, OOL for ocellocular distance, and POL for post ocellar distance.

## Taxonomy

### Genus *Eumenes* Latreille, 1802

*Eumenes* Latreille, 1802: 360; Giordani Soika 1941: 131; Yamane 1997a: 14; Kim and Yamane 2001: 139; Zhou et al. 2012: 467; Nguyen 2015: 564; Girish Kumar et al. 2017: 469; Tan et al. 2018: 139.

**Type species.** *Vespa coarctata* Linnaeus, 1758 “*Eumenes coarctata*, Fab.” [= *Vespa coarctata* Linnaeus, 1758], by subsequent designation of Latreille, 1810: 438.

**Diagnosis.** Cephalic fovea absent (Figs 5, 15, 25, 42, 52) in both sexes; clypeus emarginate both basally and apically (Figs 3, 4, 13, 14, 23, 24, 32, 40, 41, 50, 51); pronotal carina lacking (Figs 5, 15, 25, 36, 42, 52); tegula short, convex and not equalling parategula posteriorly; both pretegular carina and epicnemial carina absent; propodeal orifice with a pair of processes which are easily observed when the first metasomal segment is removed; metasomal segment 1 elongate and petiolate, and bulged apically (Figs 9, 19, 29, 35, 44, 56); T2 with a well-developed lamella at apical margin (Figs 7, 20, 30, 37, 47, 57); fore coxa with a well-developed carina on its outer face; A13 of

male antenna hook-like and apically pointed (Figs 6, 16, 26, 43, 53); parameral spine of male genitalia with a bundle of setae at its mid length (Kim and Yamane 2001).

**Distribution.** Worldwide.

### Key to all the known Chinese species of the genus *Eumenes*

- 1 Metasomal segment 1 more than 4× as long as apical width (Fig. 35) ..... **2**
- Metasomal segment 1 less than 4× as long as apical width (Figs 9, 19, 29, 44, 56)..... **7**
- 2 T1 abruptly swollen at 1/2 or 1/3 from base..... **3**
- T1 gradually widened from base to apex (fig. 7 in Nguyen 2015) ..... **4**
- 3 T1 not pear-shaped, two lateral margins of postpetiole substraight and parallel (Fig. 35) ..... ***E. belli* Giordani Soika, 1973**
- T1 pear-shaped, two lateral margins of postpetiolus not substraight and parallel (fig. 20 in Girish Kumar et al. 2017) ..... ***E. atrophicus* (Fabricius, 1798)**
- 4 Apical lamella of T2 not reflex, with small and sparse punctures at lateral side and apex (figs 10, 18 in Nguyen 2015)..... ***E. multipictus* de Saussure, 1855**
- Apical lamella of T2 reflex, with large and dense punctures at lateral side and apex (figs 7, 9 in Nguyen 2015)..... ***E. quadratus* Smith (5)**
- 5 T2 black at apex ..... ***E. q. obsoletus* Dover, 1926**
- T2 with yellow band at apex..... **6**
- 6 A long band on pronotum (figs 12–14 in Li et al. 2019).....
- ..... ***E. q. quadratus* Smith, 1852**
- A short band on pronotum (in Sonan 1939)..... ***E. q. urainus* Sonan, 1939**
- 7 Setae on postgena and propleuron shorter than those on head (fig. 7 in Kim and Yamane 2001) ..... ***E. transbaicalicus* Kurzenko, 1984**
- Setae on postgena and propleuron equal to or longer than those on head (fig. 10 Kim and Yamane 2001) ..... **8**
- 8 T1 with sparse punctures in the middle, interspaces larger than diameter of punctures (fig. 8 in Nguyen 2015)..... **9**
- T1 with dense punctures in the middle, interspaces smaller than diameter of punctures..... **14**
- 9 Basal angle of metasomal segment 2 acute (fig. 51 in Kim and Yamane 2001)..... ***E. kiangsuensis* Giordani Soika, 1941**
- Basal angle of metasomal segment 2 obtuse..... **10**
- 10 T1 with transverse groove at apex, with preapical bulge (fig. 6 in Giordani Soika 1941) ..... ***E. tosawae* Giordani Soika (11)**
- T1 without transverse groove at apex, without preapical bulge (fig. 8 in Nguyen 2015) ..... ***E. labiatus* Giordani Soika (12)**
- 11 T1 with wide yellow band at apex, without depression in the middle of the band ..... ***E. t. tosawae* Giordani Soika, 1941**
- T1 with narrow yellow band at apex, with two depressions in the middle of the band ..... ***E. t. lofouensis* Giordani Soika, 1973**

12	Body with maculation ferruginous.....	<i>E. l. labiatus</i> Giordani Soika, 1941	
–	Body with maculation bright yellow .....		13
13	T2 with a pair of small lateral spots .....	<i>E. l. sinicus</i> Giordani Soika, 1941	
–	T2 without a pair of small lateral spots .....	<i>E. l. flavoniger</i> Giordani Soika, 1986	
14	T2 bright yellow, with three connected or separated black spots in the middle .....	<i>E. tripunctatus</i> (Christ, 1791)	
–	T2 black, without three connected or separated black spots in the middle.....		15
15	T2 with sparse punctures .....		16
–	T2 with dense punctures.....		19
16	Punctures on T2 equal to or larger than those on T1 .....		17
–	Punctures on T2 smaller than those on T1.....		18
17	Metasomal segments almost without setae except for the first two .....	<i>E. variepunctatus</i> Giordani Soika, 1941	
–	Metasomal segments with white short setae .....	<i>E. architectus</i> Smith, 1859	
18	T1 stumpy, apical width more than 3× as long as basal one; T2 almost without setae (fig. 16 in Kim and Yamane 2001).....	<i>E. fraterculus</i> Dalla Torre, 1894	
–	T1 slender, apical width less than 3× as long as basal one; T2 with long setae (Fig. 19).....	<i>E. affinissimus</i> de Saussure, 1852	
19	Basal angle of metasomal segment 2 acute.....		20
–	Basal angle of metasomal segment 2 obtuse.....		25
20	Punctures on T2 smaller than those on mesosoma .....		21
–	Punctures on T2 equal to or larger than those on mesosoma.....		24
21	Lateral margin of T1 constrict at apex (fig. 32 in Kim and Yamane 2001) ....	<i>E. pedunculatus</i> (Panzer, 1799)	
–	Lateral margin of T1 parallel or expansile at apex.....		22
22	Clypeus with long setae, longer than scape width.....	<i>E. fulvopilosellus</i> Giordani Soika, 1965	
–	Clypeus with short setae, shorter than scape width (Fig. 51) .....		23
23	Lateral view, T1 swollen upwards near apical margin (fig. 25 in Kim and Yamane 2001).....	<i>E. rubrofemoratus</i> Giordani Soika, 1941	
–	Lateral view, T1 flat near apical margin (fig. 12 in Kim and Yamane 2001).....	<i>E. mediterraneus manchurianus</i> Giordani Soika, 1971	
24	Lateral margin of T1 constrict at apex; metasomal segments 3–6 with yellow bands at apex (figs 31, 35 in Girish Kumar et al. 2017) .....	<i>E. kangrae</i> Dover, 1925	
–	Lateral margin of T1 parallel at apex; metasomal segments 3–6 ferruginous (Figs 8, 9) .....	<i>E. ferruapiculus</i> sp. nov.	
25	Punctures on T2 smaller than those on mesosoma .....		26
–	Punctures on T2 equal to or larger than those on mesosoma.....		29
26	T2 with transverse wrinkles in its preapical part (Fig. 28) .....	<i>E. aquilonius</i> Yamane, 1977	
–	T2 without transverse wrinkles in its preapical part .....		27



- 27 Apical width of T1 more than 3× as long as basal one.....  
 .....*E. septentrionalis* Giordani Soika, 1940 (28)
- Apical width of T1 less than 3× as long as basal one.....  
 .....*E. formosensis* Giordani Soika, 1941
- 28 Tibiae ferruginous.....*E. s. khangmarensis* Giordani Soika, 1966
- Tibiae black, with yellow band.....*E. s. septentrionalis* Giordani Soika, 1940
- 29 Lateral margin of T1 constrict at apex..... 30
- Lateral margin of T1 parallel or expansile at apex..... 34
- 30 Apical width of T1 more than 3× as long as basal one..... 31
- Apical width of T1 less than 3× as long as basal one..... 33
- 31 T2 swollen in the middle, depressed in its preapical part..... 32
- T2 normal in the middle, flat in its preapical part.....  
 .....*E. coarctatus coarctatus* (Linnaeus, 1758)
- 32 Apical lamella of T2 not depressed in the middle (fig. 13, in Girish Kumar et al. 2017) ..... *E. assamensis* Meade-Waldo, 1910
- Apical lamella of T2 depressed in the middle .....*E. rubronotatus* Pérez, 1905
- 33 T2 swollen in the middle, depressed in its preapical part (Fig. 46) .....  
 .....*E. gibbosus* Nguyen, 2015
- T2 normal in the middle, flat in its preapical part.....  
 .....*E. ferrugiantennus* Zhou, Chen & Li, 2012
- 34 S2 with setae as long as those on head (fig. a in Smit 2005) .....  
 .....*E. coronatus coronatus* (Panzer, 1799)
- S2 with setae shorter those on head (fig. b in Smit 2005)..... 35
- 35 T2 swollen at apex, with transverse groove in its preapical part (figs 21, 22 in Zhou et al. 2012).....*E. nigriscutatus* Zhou, Chen & Li, 2012
- T2 normal at apex, without transverse groove in its preapical part ..... 36
- 36 T1 abruptly swollen at 1/2 from base..... 37
- T1 abruptly swollen at 1/3 from base..... *E. punctatus* de Saussure, 1852
- 37 Apical lamella of T2 not depressed in the middle.....  
 .....*E. pomiformis* (Fabricius, 1781)
- Apical lamella of T2 depressed in the middle .....*E. buddha* Cameron, 1897

***Eumenes ferruapiculus* Qin, Chen & Li, sp. nov.**

<https://zoobank.org/FB87AB7F-16B7-49C9-AA64-8AB56D2CB9FB>

Figs 1–10

**Material examined.** *Holotype*, ♀, CHINA, Yunnan Province, Diqing Tibetan Autonomous Prefecture, Deqin County, Benzilan Town, 29°34'08"N, 106°33'28"E, 3400 m, 2011.vii.21, Ting-Jing Li (CNU); *Paratype*, 2♀1♂, same data as holotype.

**Diagnosis.** This species is similar to *E. labiatus* by the following character combination: T1 with pear-shaped, two lateral margins of postpetiole substraight and parallel from basal third to apex (Fig. 9). It is easily distinguished from the related species and

other members of the genus by the combination of following characters: head and antennal scape with dense setae about as long as scape width (Fig. 3), basal angle of metasomal segment 2 acute, T1 and T2 black, other metasomal segments almost ferruginous (Fig. 7), and apex of penis valves convex in genitalia (Fig. 10) (depressed in *E. labiatus*).

**Description. Female** (Fig. 1): body length 14.2–15.6 mm. Body black, with dense and short setae, with following parts ferruginous: clypeus (Fig. 3), mandible except base, antenna except small spots of A1 and A2, lower margin of ocular sinus, inter-antennal spot reaching clypeus, a band on upper gena (Fig. 5), pronotum (Fig. 5), tegula, apex of parategula, tibiae and tarsi (Fig. 1), apical thin and interrupted band on T2, and visible parts of metasomal segments 3–6 (Figs 12, 14); wing mostly ferruginous brown.

**Head.** Head (Fig. 3) wider than long in frontal view, maximum width of head  $1.12\times$  its length; clypeus with punctures denser at base than other part, clypeal maximum width  $1.10\times$  its length, slightly convex, apex emarginate forming two wide lateral teeth, apical width  $1.57\times$  distance between antennal sockets; inter-antennal area with longitudinal carina; scape with dense setae shorter than scape width; frons coarsely punctate and distinctly reticulated, punctures on vertex and gena similar to those of frons; POL  $0.91\times$  OOL; distance between anterior and posterior ocelli  $1.1\times$  diameter of anterior ocellus (Fig. 5).

**Mesosoma.** Mesosoma (Fig. 5) with short and dense setae as long as those on head, wholly with coarse and dense punctures similar to or denser than those on vertex, those on mesoscutum and mesopleuron a little denser and reticulate; median length of mesoscutum  $1.02\times$  its maximum width; propodeum with median longitudinal groove.

**Metasoma.** (Figs 7–9). Metasoma with sparse setae shorter than those on mesosoma; T1 densely punctate, punctures similar to those on mesoscutum, length of T1 less than  $4\times$  its apical width and abruptly swollen from one-third near base, then lateral margin parallel at apex, and not constrict near apical margin (Fig. 9); T2 densely punctate, punctures obviously smaller than those of T1, apical lamella of T2 not reflex and not depressed in the middle (Fig. 7); basal angle of segment 2 acute in lateral view (Fig. 8); T2 not strongly swollen in the middle, weakly depressed in its preapical part; visible parts of other metasomal segments normal, with sparse short setae (Fig. 8).

**Male.** Body length 11.1 mm (Fig. 2). Sculpture, setae, and coloration similar to female except as follows: clypeus entirely yellow (Fig. 4), apex of A13 reaching basal fourth of A11 (Fig. 6), apex of penis valves convex in genitalia (Fig. 10).

**Distribution.** China (Yunnan).

**Etymology.** The specific name *ferruapiculus* is derived from two Latin words: *ferrugineus* (= ferruginous) and *apex*, referring to ferruginous apex of metasoma.

### *Eumenes affinissimus* de Saussure, 1852, new record

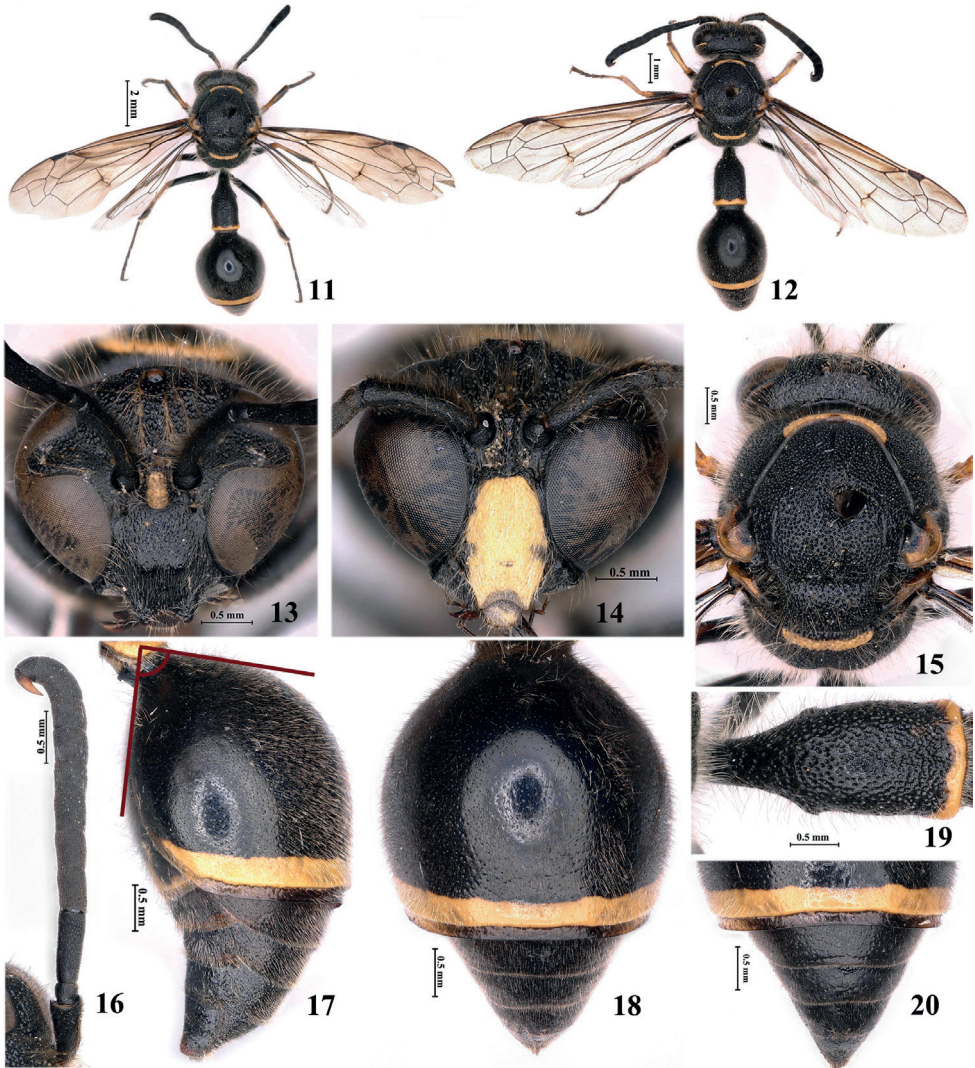
Figs 11–20

*Eumenes affinissima* de Saussure, 1852: 37; Smith 1873: 371; Bingham 1897: 335, 340; Paiva 1907: 15; Dutt 1912: 229; Dover and Rao 1922: 237; Dover 1925



**Figures 1–10.** *Eumenes ferruapiculus* sp. nov. holotype (♀) (1, 3, 5, 7–9) paratype (♂) (2, 4, 6, 10) 1, 2 habitus (dorsal view) 3, 4 clypeus (frontal view) 5 head and pronotum (dorsal view) 6 antenna 7 T2–T6 (dorsal view) 8 metasomal segments 2–6 (lateral view) 9 T1 (dorsal view) 10 genitalia.





**Figures 11–20.** *Eumenes affinisimus* de Saussure, 1852. ♀: 11, 13, 15, 17–20 ♂: 12, 14, 16. 11, 12 habitus (dorsal view) 13, 14 clypeus (frontal view) 15 head and pronotum (dorsal view) 16 antenna 17 metasomal segments 2–6 (lateral view) 18 T2 (dorsal view) 19 T1 (dorsal view) 20 lamella of T2 apical margin (dorsal view).

(1924): 292; von Schulthess 1935: 299; Giordani Soika 1960: 159; Gusenleitner 2006: 693; Girish Kumar et al. 2017: 471; Fateryga et al. 2023: 447.

? *Eumenes pomiformis* var. *affinissima*: Maindron, 1882: 268; Dalla Torre 1894: 30; 1904: 24; Dover 1931: 252.

*Eumenes coelestimontana* Kostylev, 1940: 140; Gusenleitner 1972: 71, 87; van der Vecht and Fischer 1972: 126; Gusenleitner 2006: 693.

**Material examined.** 1♂, CHINA, Tibet, Linzhi City, Bomi County, Yigong Village, 29°34'08"N, 106°33'28"E, 3300 m, 2014.viii.1, Ting-Jing Li (CNU); 3♀6♂,

CHINA, Gansu Province, Zhangye City, Sunan County, 36°40'40"N, 102°25'19"E, 3200 m, 2019.vii.2, Xue Zhang (CNU); 1♂, CHINA, Ningxia Province, Guyuan City, Jingyuan County, Shan'an Village, 35°26'49"N, 106°25'37"E, 1778 m, 2020.vii.30, Qian Han (CNU).

**Diagnosis. Female.** Body length 10.3–11.4 mm. Body black, with yellow markings (Fig. 11): interantennal spot reaching clypeus, gena, pronotum anteriorly, band of metanotum, tegula mostly (Fig. 15), fore tibia largely, and apical bands of T1 and T2; body with setae dense and long, those on head longer than scape width; clypeus entirely black, longer than wide, with long setae (Fig. 13); dorsal view (Figs 18, 19), T1 densely punctate, length of T1 less than 4× its apical width and abruptly swollen from one-third near base, then lateral margin parallel at apex, and not constrict near apical margin; T2 sparsely punctate, punctures obviously smaller than those of T1, apical lamella of T2 not reflex, and not depressed in the middle (Fig. 20); basal angle of segment 2 acute in lateral view (Fig. 17), T2 not strongly swollen in the middle, weakly depressed in its preapical part; and wings pale brown.

**Male.** Body length 8.6–9.7 mm (Fig. 12). Sculpture, setae, and coloration similar to female except as follows: clypeus yellow except lateral margin (Fig. 14); apex of A13 reaching basal fourth of A10 (Fig. 16).

**Distribution.** China (Tibet, Gansu, Ningxia); Pakistan; Tajikistan; Uzbekistan; Kyrgyzstan; Kazakhstan; Mongolia; India; Bangladesh; Myanmar; Malaysia; Indonesia: Java.

### *Eumenes aquilonius* Yamane, 1977, new record

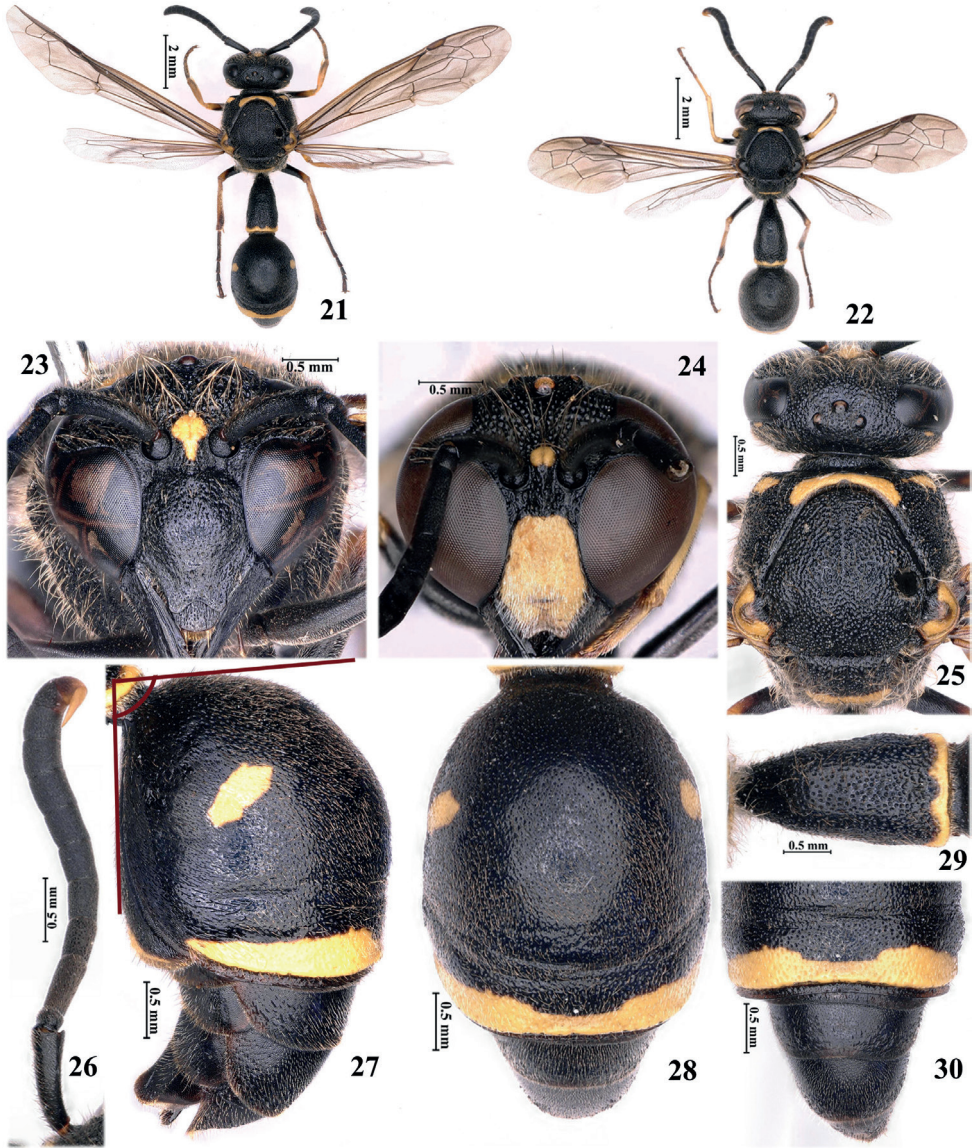
Figs 21–30

*Eumenes rubronotatus aquilonius* Yamane, 1977b: 59; 1990: 148; Kurzenko 1995: 321.  
*Eumenes aquilonius*: Kim and Yamane 2001: 139, 143, 153; Yoon and Kim 2014: 234.

**Material examined.** 2♀, CHINA, Inner Mongolia, Alxa League, Ho-lan Mountains, 38°58'08"N, 105°51'32"E, 2000 m, 2010.vii.29, Fangzhou Ma (CNU); 1♂, CHINA, Jilin Province, Linjiang City, Naozhi Town, 38°12'50"N, 105°24'07"E, 510 m, 2012.vii.8, Xin Zhou (CNU); 2♀, CHINA, Sichuan Province, Guangyuan City, Qingchuan County, Qingxi Town, Pingqiao Village, 32°28'51"N, 104°51'36"E, 1200 m, 22.VII.2018, Xue Zhang (CNU); 1♀1♂, CHINA, Sichuan Province, Langzhong City, Boshu Hui Autonomous County, Qingzhen Village, 31°33'54"N, 106°03'36"E, 608 m, 2020.vii.18, Jie Chen (CNU); 1♀, CHINA, Sichuan Province, Chengdu City, Dayi County, Xieyuan Town, 30°37'12"N, 103°20'49"E, 500 m, 2018.viii.13, Huachan Wang (CNU); 1♂, CHINA, Shanxi Province, Hanzhong City, Nanzhen County, Hongmiao Town Qunfu Village, 32°47'38"N, 106°54'14"E, 484 m, 2017.vii.16, Pan Huang (CNU).

**Diagnosis. Female.** Body length 9.6–10.4 mm; black, with yellow markings (Fig. 21): interantennal spot, gena, lateral side of pronotum, pronotum anteriorly, band of metanotum, tegula mostly (Fig. 25), fore tibia largely, apical bands of both T1





**Figures 21–30.** *Eumenes aquilonius* Yamane, 1977. ♀ (21, 23, 25, 27–30) ♂ (22, 24, 26) 21, 22 habitus (dorsal view) 23, 24 clypeus (frontal view) 25 head and pronotum (dorsal view) 26 antenna 27 metasomal segments 2–6 (lateral view) 28 T2 (dorsal view) 29 T1 (dorsal view) 30 lamella of T2 apical margin (dorsal view).

and T2, and lateral spots of T2; body with setae sparse and short, those on head longer than scape width; clypeus entirely black, longer than wide, with short setae (Fig. 23); dorsal view (Figs 28, 29), T1 densely punctate, length of T1 less than 4× its apical width and abruptly swollen before middle; T2 sparsely punctate, punctures obviously

smaller than those of T1, apical lamella of T2 not reflex and weakly depressed in the middle (Fig. 30); lateral view (Fig. 27), basal angle of metasomal segment 2 obtuse, T2 swollen in the middle, with transverse wrinkles and weakly depressed in its preapical part; wings pale brown.

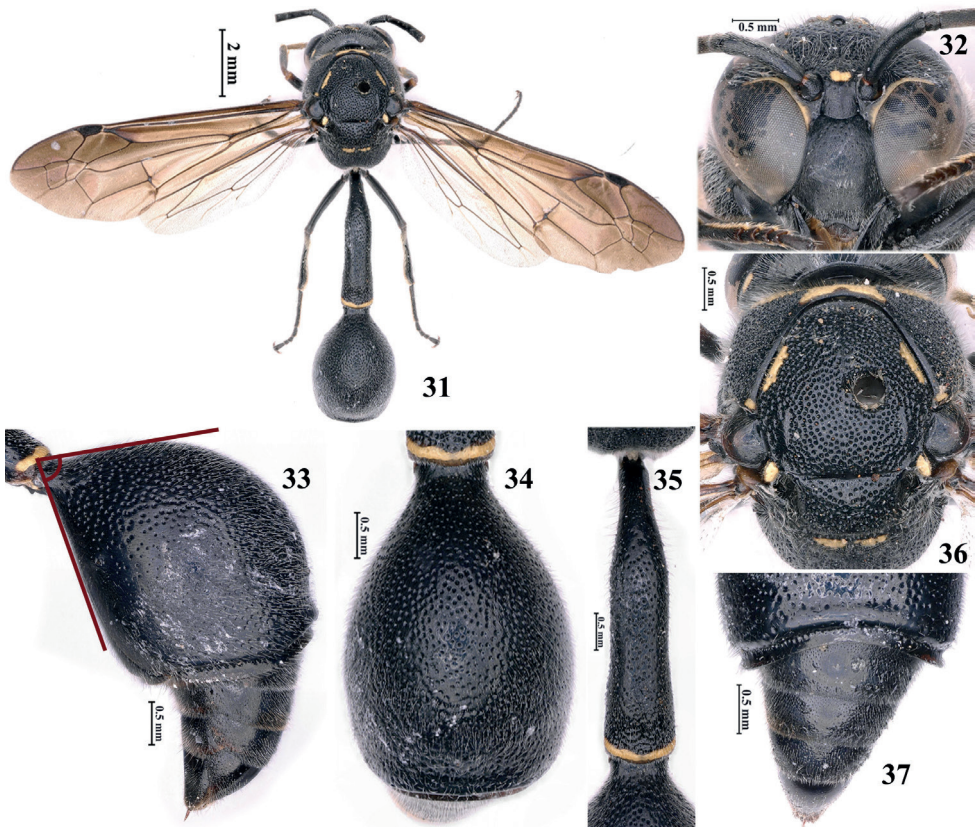
**Male.** Body length 7.8–8.4 mm (Fig. 22). Sculpture, setae, and coloration similar to female except as follows: clypeus entirely yellow (Fig. 24); apex of A13 reaching basal fourth of A10 (Fig. 26).

**Distribution.** China (Inner Mongolia, Jilin, Sichuan, Shanxi); Russia; Korea; Japan.

***Eumenes belli* Giordani Soika, 1973, new record**

Figs 31–37

*Eumenes belli* Giordani Soika, 1973: 125; 1986a: 82; Girish Kumar et al. 2017: 477.



**Figures 31–37.** *Eumenes belli* Giordani Soika, 1973. ♀ **31** habitus (dorsal view) **32** clypeus (frontal view) **33** metasomal segments 2–6 (lateral view) **34** T2 (dorsal view) **35** T1 (dorsal view) **36** head and pronotum (dorsal view) **37** lamella of T2 apical margin (dorsal view).



**Material examined.** 1♀, CHINA, Yunnan Province, Lincang City, Shuangjiang County, Mengling Village, Nangong River, 23°23'13"N, 99°47'04"E, 1050 m, 2019.vi.3, Huachuan Wang (CNU).

**Diagnosis. Female.** Body length 12.1 mm. Body black, with yellow markings (Fig. 31): ocular sinus, interantennal spot, gena, three separated narrow transverse bands on pronotum, mesoscutum spot, metanotum separated spots, parategula (Fig. 36) and apical band of T1; body with setae sparse and short; clypeus entirely black, sparsely punctate, longer than wide, with short setae (Fig. 32); dorsal view (Figs 34, 35), T1 densely punctate, very long, slender, length of T1 longer than 4× its apical width and abruptly swollen before middle, lateral margins of postpetiole substraight and parallel, not swollen in apical part; T2 densely punctate, punctures obviously larger than those of T1, apical lamella of T2 reflex and obviously depressed in the middle (Fig. 37); lateral view (Fig. 33), basal angle of metasomal segment 2 acute, T2 not swollen in the middle, obviously depressed in its preapical part; wings pale brown.

**Male.** (in Girish Kumar et al. 2017). Body length: 10.5–11.5 mm. Sculpture, punctuation, setae, and coloration similar to female, including clypeus entirely black.

**Distribution.** China (Yunnan); India.

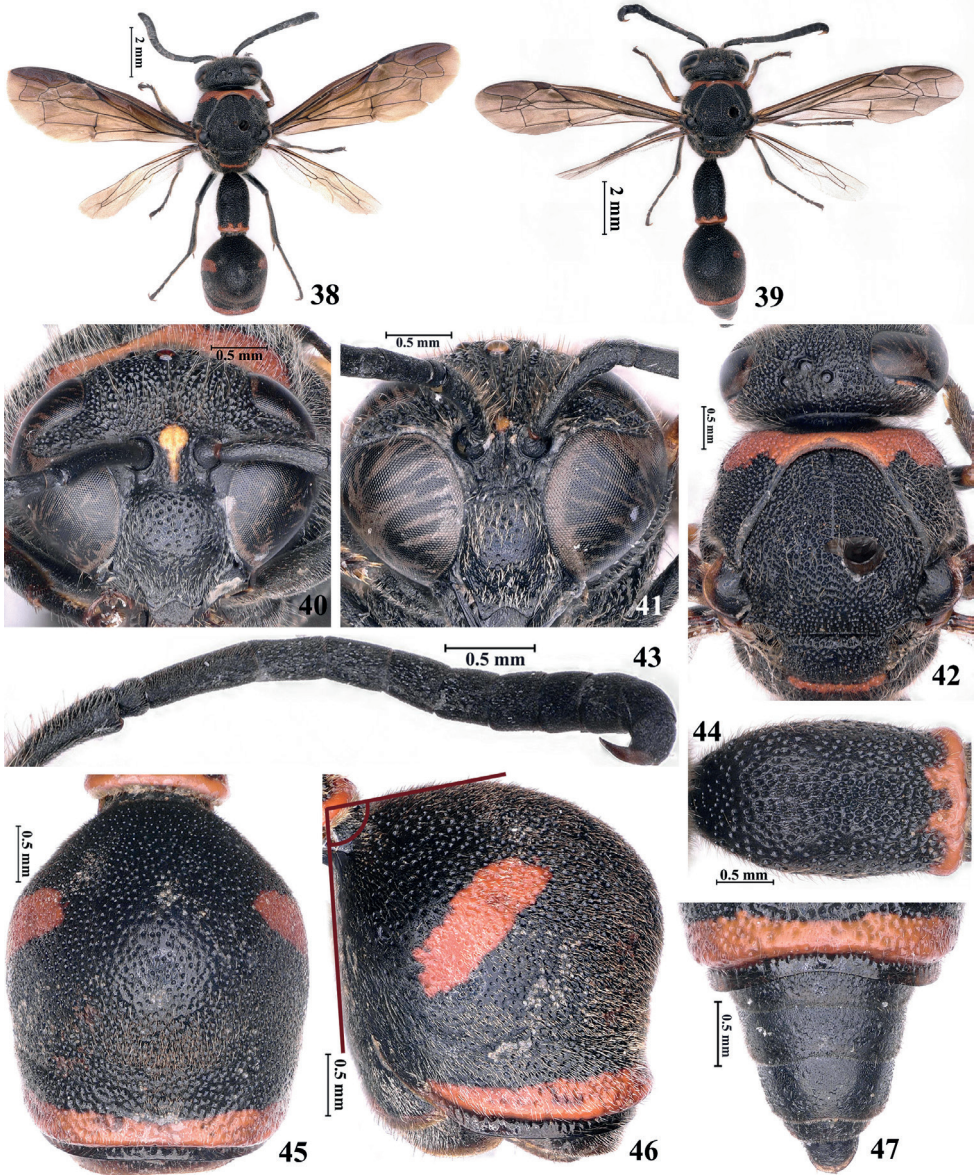
### *Eumenes gibbosus* Nguyen, 2015, new record

Figs 38–47

*Eumenes gibbosus* Nguyen, 2015: 565.

**Material examined.** 2♂, CHINA, Sichuan Province, Liangshan Yi Autonomous Prefecture, Dechang County, Ayue Village, 27°30'25"N, 102°10'51"E, 1800 m, 2011.viii.3, Ting-Jing Li (CNU); 3♂, CHINA, Sichuan Province, Liangshan Yi Autonomous Prefecture, Xide County, Hongmo Town, 28°06'10"N, 102°15'32"E, 1800 m, 2011.viii.3, Ting-Jing Li (CNU); 1♂, CHINA, Sichuan Province, Panzhihua City, Miyi County, Baima Twon, 27°30'46"N, 102°10'04"E, 2566 m, 2011.viii.29, Ting-Jing Li (CNU); 3♀6♂, CHINA, Yunnan Province, Lijiang City, Ninglang Yi autonomous County, Daxing Town, 27°17'16"N, 100°51'32"E, 2416 m, 2011.vii.26, Ting-Jing Li (CNU); 2♀3♂, CHINA, Yunnan Province, Lijiang City, Yulong Naxi autonomous County, Shigu Town, 26°52'19"N, 99°58'11"E, 2416 m, 2011.vii.23, Ting-Jing Li (CNU); 1♀1♂, CHINA, Yunnan Province, Baoshan City, Lujiang Dam, Puman Village, 24°56'13"N, 98°47'31"E, 1800 m, 2006.vii.11, Rui Zhang (CNU); 4♀2♂, CHINA, Yunnan Province, Dali City, Yunlong County, Nuodun Town, 25°53'31"N, 99°22'37"E, 2512 m, 2011.vii.10, Ting-Jing Li (CNU).

**Diagnosis. Female.** Body length 10.8–11.3 mm. Body black, with ferruginous markings (Fig. 38): gena, pronotum anteriorly, band of metanotum (Fig. 42), apical bands of both T1 and T2, and lateral spots of T2; interantennal with yellow spot, tegula and fore tibia mostly black; setae dense and short; clypeus entirely black, longer than wide, with short white setae, with deep and sparse punctures at center



**Figures 38–47.** *Eumenes gibbosus* Nguyen, 2015. ♀ (38, 40, 42, 44–46) ♂ (39, 41, 43, 47). 38, 39 habitus (dorsal view) 40, 41 clypeus (frontal view) 42 head and pronotum (dorsal view) 43 antenna 44 T1 (dorsal view) 45 T2 (dorsal view) 46 metasomal segments 2 (lateral view) 47 lamella of T2 apical margin (dorsal view).

(Fig. 40); dorsal view (Figs 44, 45), T1 densely punctate, length of T1 less than 4× its apical width and abruptly swollen from one-third near base, then lateral margin parallel at apex, and slightly constrict near apical margin; T2 densely punctate, punctures smaller than those of T1, apical lamella of T2 not reflex and depressed in the

middle (Fig. 47); lateral view (Fig. 46), basal angle of metasomal segment 2 obtuse, T2 obviously swollen in the middle, obviously depressed in its preapical part; wings pale brown.

**Male.** Body length 9.8–10.2 mm (Fig. 39). Sculpture, setae, and coloration similar to female, including clypeus entirely black (Fig. 41); apex of A13 reaching basal fourth of A10 (Fig. 43).

**Distribution.** China (Sichuan, Yunnan); Vietnam.

### *Eumenes rubrofemoratus* Giordani Soika, 1941, new record

Figs 48–57

*Eumenes rubrofemoratus* Giordani Soika, 1941: 135, 145; Iwata 1953: 25–44; Ishikawa 1965: 292; van der Vecht and Fischer 1972: 132; Yamane 1977a: 16; Giordani Soika 1986b: 156; Yamane 1990: 144; Borsato and Ratti 1999: 93; Kim and Yamane 2001: 141, 147.

*Eumenes coarctatus rubrofemoratus*: Kurzenko 1995: 320.

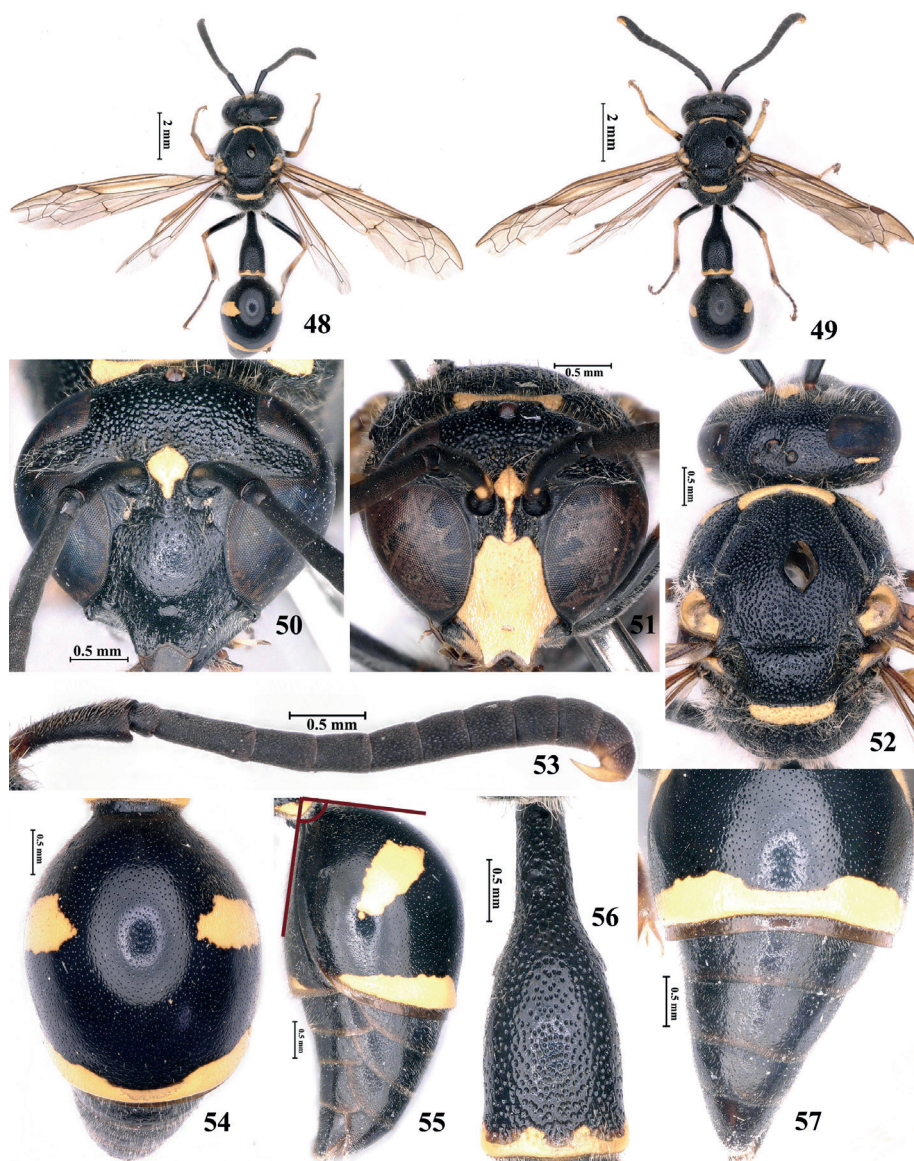
**Material examined.** 8♀6♂, CHINA, Inner Mongolia Autonomous Region, Alxa League, Ho-lan Mountains, 38°58'08"N, 105°51'32"E, 2000 m, 2010.vii.29, Fangzhou Ma (CNU); 1♂, CHINA, Gansu Province, Longnan City, Liangdang County, Liangdang Village, 33°58'19"N, 106°24'21"E, 1000 m, 2016.vii.15, Zhenxia Ma (CNU); 1♂, CHINA, Gansu Province, Zhangye City, Sunan County, Daba Village, 38°48'54"N, 99°37'37"E, 3633 m, 2019.vii.3, Xue Zhang (CNU); 1♂, CHINA, Shanxi Province, Xian City, Zhuque national forest park 33°47'20"N, 108°35'17"E, 2257 m, 2012.vii.12, Ting-Jing Li (CNU); 3♀1♂, CHINA, Liaoning Province, Liaoyang City, Gongchangling District 41°09'25"N, 123°25'37"E, 569 m, 2012.vii.13, Xin Zhou (CNU).

**Diagnosis. Female.** Body length 11.3–11.6 mm. Body black, with yellow markings (Fig. 48): interantennal spot, gena, pronotum anteriorly, band of metanotum, tegula mostly (Fig. 52), fore tibia largely, apical bands of both T1 and T2, and lateral spots of T2; body with setae sparse and short; clypeus entirely black, longer than wide, with shallow and sparse punctures at center (Fig. 50); dorsal view (Figs 54, 56), T1 densely punctate, length of T1 less than 4× its apical width and abruptly swollen before middle, then lateral margin expansile at apex, and not constrict near apical margin; T2 sparsely punctate, punctures obviously smaller than those of T1, apical lamella of T2 not reflex and not depressed in the middle (Fig. 57); lateral view (Fig. 55), basal angle of metasomal segment 2 acute, T2 not strongly swollen in the middle, weakly depressed in its preapical part; wings pale brown.

**Male.** Body length 9.6–10.1 mm (Fig. 49). Sculpture, setae, and coloration similar to female except as follows: clypeus entirely yellow (Fig. 51); apex of A13 reaching basal fourth of A10 (Fig. 53).

**Distribution.** China (Inner Mongolia, Liaoning, Shanxi, Gansu); Japan.





**Figures 48–57.** *Eumenes rubrofemoratus* Giordani Soika, 1941. ♀ (48, 50, 52, 54–57) ♂ (49, 51, 53). 48–49 habitus (dorsal view) 50, 51 clypeus (frontal view) 52 head and pronotum (dorsal view) 53 antenna 54 T2 (dorsal view) 55 metasomal segments 2 (lateral view) 56 T1 (dorsal view) 57 lamella of T2 apical margin (dorsal view).

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