

## Research article

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# New and little-known bees of the genus *Sphecodes* Latreille, 1804 (Hymenoptera: Apoidea: Halictidae) from the Himalayas

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**Abstract.** An annotated list of twenty species of rarely collected and little known bees of the genus *Sphecodes* Latreille, 1804 (Hymenoptera: Apoidea: Halictidae) from the Himalayas is given. *Sphecodes bluethgeni* sp. nov. is described from Bhutan. Three species are newly recorded from the Himalayas: *S. binghami* Blüthgen, 1924, *S. kershawi* Perkins, 1921 and *S. laticeps* Meyer, 1920. Based on type specimens, new synonymies have been proposed for *Sphecodes cameronii* (Bingham, 1897) = *S. armeniacus* Warncke, 1992 syn. nov.; *S. gibbus* (Linnaeus, 1758) = *S. indicus* Bingham, 1898 syn. nov.; and *S. invidus* (Cameron, 1897) = *S. nigrobasalis* Meyer, 1922 syn. nov. A lectotype is designated for *Sphecodes sikkimensis* Blüthgen, 1927. Illustrated keys to males and females of all species known from the Himalayas and an updated checklist of the 26 Himalayan species of *Sphecodes* are provided. Additionally, one new species from neighboring Uttar Pradesh (India), *Sphecodes uttaricus* sp. nov., is here described as new and included due to its close relationship to the Himalayan *S. sikkimensis* Blüthgen, 1927.

**Keywords.** Taxonomy, new species, new synonyms, fauna, Oriental region.

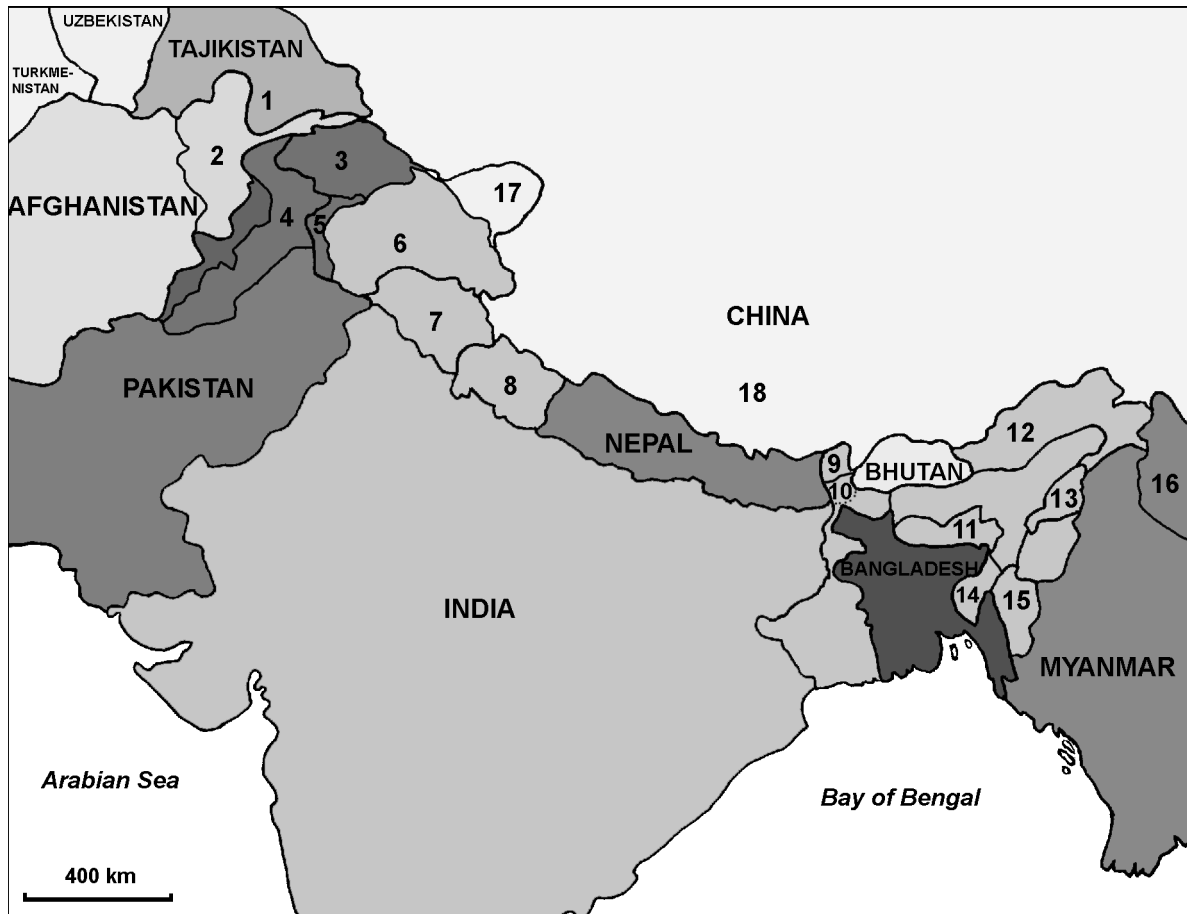
Astafurova Y. & Proshchalykin M. 2020. New and little-known bees of the genus *Sphecodes* Latreille, 1804 (Hymenoptera: Apoidea: Halictidae) from the Himalayas. *European Journal of Taxonomy* 729: 74–120. <https://doi.org/10.5852/ejt.2020.729.1195>

## Introduction

The cleptoparasitic genus *Sphecodes* Latreille, 1804, numbering 70 species in the Palaearctic Region and 50 species in the Oriental Region, has long been one of the least studied groups in the family Halictidae Thomson, 1869. Previous reviews of some regional faunas (Central and Southeast Asia, Mongolia, China, Turkey, Iran, Caucasus, Near East, Central Europe, etc.) have significantly improved our knowledge of these bees, helping bridge the gaps in our knowledge of *Sphecodes* in these territories. The species composition of these faunas has been greatly clarified, twelve new species have been

described, seventeen new synonymies have been proposed, and the taxonomical status of some species has been revised (Bogusch & Straka 2012; Astafurova & Proshchalykin 2014, 2015a, 2015b, 2015c, 2016a, 2016b, 2017a, 2017b, 2018; Astafurova *et al.* 2015, 2018a, 2018b, 2018c, 2018d, 2019, 2020b; Özbek *et al.* 2015).

However, the territories located in the transitional zone between the Palaearctic and the Oriental regions remain insufficiently studied. The Himalayas are the perfect example of this situation. Geographically, the Himalayas are located in the Indian subcontinent. The countries and territories included are: India (Arunachal Pradesh, Himachal Pradesh, Jammu and Kashmir, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, Darjeeling district of West Bengal), Tajikistan (Gorno-Badakhshan Province), Afghanistan (Badakhshan Province), Bhutan, Nepal, China (Aksai Chin, Xizang), Myanmar (Kachin State), and Pakistan (Azad Jammu and Kashmir, Gilgit-Baltistan, Khyber Pakhtunkhwa) (Fig. 1). The bee fauna of the Himalayas is generally under-recorded and, given the enormous size and ecological diversity of the area, the discovery of large numbers of undescribed species including endemics is very



**Fig. 1.** Geographic map of the Himalayas and surrounding territories. 1 = Gorno-Badakhshan Province (Tajikistan); 2 = Badakhshan Province (Afghanistan); 3 = Gilgit-Baltistan; 4 = Khyber Pakhtunkhwa; 5 = Azad Jammu and Kashmir (Pakistan); 6 = Jammu and Kashmir; 7 = Himachal Pradesh; 8 = Uttarakhand; 9 = Sikkim; 10 = Darjeeling district of West Bengal; 11 = Meghalaya; 12 = Arunachal Pradesh; 13 = Nagaland; 14 = Tripura; 15 = Mizoram (India); 16 = Kachin State (Myanmar); 17 = Aksai Chin; 18 = Xizang (China).

likely. Thus, the goal of this paper is to improve our knowledge of the taxonomy and distribution of Himalayan *Sphécodes* bees as an essential foundation for more advanced biogeographical investigations.

The first information on the genus *Sphécodes* from the Himalayas was published by Smith (1853), who described *S. fumipennis* from “N. India”. This species has since only been recorded from Sikkim (Blüthgen 1924, 1927; Saini & Rathor 2012; Rajkumar & Dey 2016). A total of nineteen species have been described since from the Himalayas (Blüthgen – 6 species, Nurse – 4 species, Smith – 3 species, Cameron – 2 species, Bingham – 2, Cockerell – 1, and Gupta & Saini – 1), with fourteen of them still valid (see section on taxonomy for details). In total, twenty three species of *Sphécodes* have been recorded from the Himalayas so far (Table 1).

In the present paper, based on a comprehensive study of specimens (including types) deposited in various collections, we report additional records of 20 species from this area. Further, one species is described as new and three species are recorded from the Himalayas for the first time, resulting in a total number of 26 species of *Sphécodes* known from this region (Table 1). The genus *Sphécodes* has not yet been documented from the Badakhshan Province of Afghanistan, Kachin State of Myanmar or Chinese Aksai Chin and Xizang, but it is probable that this cosmopolitan genus is present in these territories and it is only a matter of time before their faunas are sampled and recorded. A key to all species occurring in the Himalayas is also presented.

In addition, we describe a new species from neighboring Uttar Pradesh (India), *Sphécodes uttaricus* sp. nov., included due to its close relationship to the Himalayan *S. sikkimensis* Blüthgen, 1927, propose new synonymies for three specific names (*Sphécodes cameronii* (Bingham, 1897) = *S. armeniacus* Warncke, 1992 syn. nov.; *S. gibbus* (Linnaeus, 1758) = *S. indicus* Bingham, 1898 syn. nov.; and *S. invidus* (Cameron, 1897) = *S. nigrobasalis* Meyer, 1922 syn. nov.), and designate a lectotype for *Sphécodes sikkimensis* Blüthgen, 1927 in order to clarify the status and diagnosis of type specimens.

## Material and methods

The results presented in this paper are based on 66 specimens collected in the Himalayas and currently housed in the following depositories:

- NHMUK = Natural History Museum, London, UK
- OLBL = Oberösterreichisches Landesmuseum, Biologiezentrum, Linz, Austria
- OUMNH = Oxford University Museum of Natural History, UK
- PCMS = private collection of Maximilian Schwarz, Ansfelden, Austria
- ZISP = Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia
- ZMHB = Museum für Naturkunde der Humboldt Universität zu Berlin, Germany
- ZMMU = Zoological Museum of Moscow University, Russia

The taxonomy and distribution of species follows that of Warncke (1992), Astafurova & Proshchalykin (2017b) and Astafurova *et al.* (2020a, 2020b). Morphological terminology follows that of Engel (2001) and Michener (2007). The ventral surface of some flagellomeres bears a distinctive patch of sensilla trichodea A (sensu Ågren & Svensson 1982), which we refer to as ‘tyloids’, easily observable under the microscope. The abbreviations F, T and S are used for flagellomere, metasomal tergum and metasomal sternum respectively. The density of integumental punctures is described using the following formula: puncture diameter (in  $\mu\text{m}$ ) / ratio of distance between punctures to average puncture diameter, e.g., 15–20  $\mu\text{m}$  / 0.5–1.5. Integumental sculpture other than distinctive surface punctation is described following Harris (1979): areolate – coarse, contiguous punctures; reticulate – superficially net-like or network of raised lines; rugose – irregular, nonparallel, wrinkled raised lines (rugae); rugulose – minutely rugose;

**Table 1.** Checklist of the species of *Sphcodes* Latreille, 1804 of the Himalayas including distribution by countries and provinces. Abbreviations: P = Palearctic species; O = Oriental species; E = endemic.

N	Species of <i>Sphcodes</i>	Country	Published data	Type of area
1	<i>S. albilabris</i> (Fabricius, 1793)	India (*Himachal Pradesh), *Nepal, Tajikistan (Gorno-Badakhshan Province)	Astafurova & Proshchalykin 2017b	P
2	<i>S. almoransis</i> Gupta & Saini, 2018	India (Uttarakhand)	Gupta & Saini 2018	E
3	<i>S. alternatus</i> Smith, 1853	Tajikistan (Gorno-Badakhshan Province)	Astafurova & Proshchalykin 2017b	P
4	<i>S. binghami</i> Blüthgen, 1924	*Nepal	first record	O
5	<i>S. bluethgeni</i> sp. nov.	*Bhutan	first record	E
6	<i>S. cameronii</i> (Bingham, 1897)	*Nepal, India (Uttarakhand)	Rajkumar & Dey 2016	P–O
7	<i>S. dissimilandus</i> (Cameron, 1897)	India (Uttarakhand)	Cameron 1897; Saini & Rathor 2012; Rajkumar & Dey 2016	E
8	<i>S. fumipennis</i> Smith, 1853	India (Sikkim)	Blüthgen 1924, 1927; Saini & Rathor 2012; Rajkumar & Dey 2016	O
9	<i>S. gibbus</i> (Linnaeus, 1758)	India (Jammu and Kashmir, Simla), Tajikistan (Gorno-Badakhshan Province)	Smith 1853; Bingham 1898; Nurse 1903; Saini & Rathor 2012; Astafurova & Proshchalykin 2017b	P
10	<i>S. hakkariensis</i> Warncke, 1992	Tajikistan (Gorno-Badakhshan Province)	Astafurova <i>et al.</i> 2018c	P
11	<i>S. intermedius</i> Blüthgen, 1923	Tajikistan (Gorno-Badakhshan Province)	Astafurova & Proshchalykin 2017b	P
12	<i>S. invidus</i> (Cameron, 1897)	India (Uttarakhand, Meghalaya)	Cameron 1897; Meyer 1922	E
13	<i>S. iridipennis</i> Smith, 1879	India (Uttarakhand, Himachal Pradesh)	Saini & Rathor 2012; Gupta 2013; Ascher & Pickering 2020	E
14	<i>S. kershawi</i> Perkins, 1921	*India (Uttarakhand)	first record	O
15	<i>S. lasimensis</i> Blüthgen, 1927	India (Himachal Pradesh), *Nepal	Blüthgen 1927; Saini & Rathor 2012; Rajkumar & Dey 2016; Ascher & Pickering 2020	E
16	<i>S. laticeps</i> Meyer, 1920	*Nepal	first record	O
17	<i>S. monilicornis</i> (Kirby, 1802)	India (Jammu and Kashmir), *Nepal, Tajikistan (Gorno-Badakhshan Province)	Nurse 1903; Blüthgen 1927; Saini & Rathor 2012; Astafurova & Proshchalykin 2017b	P
18	<i>S. montanus</i> Smith, 1879	India (Uttarakhand), *Nepal, *Bhutan	Smith 1879; Rajkumar & Dey 2016	O
19	<i>S. perplexus</i> Nurse, 1903	India (Jammu and Kashmir)	Nurse 1903; Saini & Rathor 2012	E
20	<i>S. rufiventris</i> (Panzer, 1798)	Tajikistan (Gorno-Badakhshan Province)	Astafurova & Proshchalykin 2017b	P
21	<i>S. setiger</i> Blüthgen, 1924	India (Himachal Pradesh)	Blüthgen 1924	E
22	<i>S. shillongensis</i> Blüthgen, 1927	India (Meghalaya)	Saini & Rathor 2012; Ascher & Pickering 2020	E
23	<i>S. sikkimensis</i> Blüthgen, 1927	India (Sikkim)	Blüthgen 1927; Saini & Rathor 2012; Rajkumar & Dey 2016	O
24	<i>S. simlaensis</i> Blüthgen, 1924	India (Jammu and Kashmir, Himachal Pradesh, *Uttarakhand), *Nepal, *Bhutan	Blüthgen 1924, 1927; Saini & Rathor 2012; Rajkumar & Dey 2016	O
25	<i>S. tantalus</i> Nurse, 1903	India (Jammu and Kashmir)	Nurse 1903; Saini & Rathor 2012; Dar & Wani, 2018; Dar <i>et al.</i> 2018	E
26	<i>S. turneri</i> Cockerell, 1916	India (Meghalaya)	Cockerell, 1916; Ascher & Pickering 2020	O



strigate – narrow, transverse or longitudinal streaks (strigae), variety of parallel lineations; tessellate – regular network of shallow grooves with flat interspaces.

Specimens were studied with a Leica M205A stereo microscope and photographs taken with a combination of stereo microscope (Olympus SZX10) and digital camera (Olympus OM-D and Canon EOS70D). Final images are stacked composites using Helicon Focus 6. Specimen data and images of NHMUK specimens (Figs 7, 12–13) were recorded in the NHMUK database or on the NHMUK database website, and are publicly available through the NHMUK Data Portal (Natural History Museum 2014). All images were post-processed for contrast and brightness using Adobe Photoshop. New distributional records are noted with an asterisk (\*).

## Results

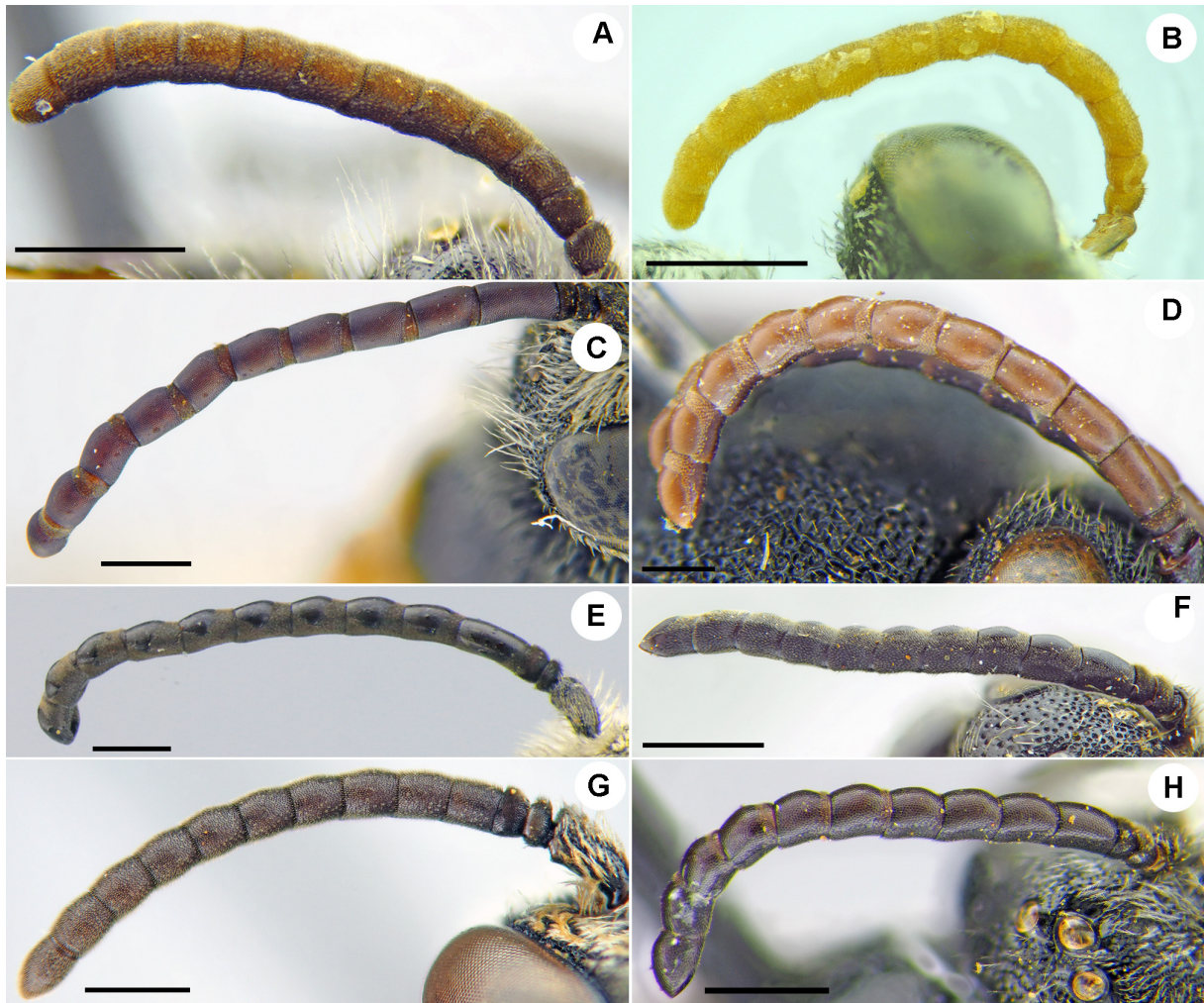
### *Key to the species of Sphecodes of the Himalayas*

Males are unknown in *S. almoransis*, *S. binghami*, *S. bluethgeni* sp. nov., *S. iridipennis*, *S. perplexus*, *S. setiger*, *S. tantalus*, and females are unknown in *S. dissimilandus*, *S. invidus*, *S. shillongensis*.

#### Males

1. Costal margin of hind wing with 7–14 hamuli. Base of gonocoxite dorsally without impression. Usually larger species: total body length 6.0–14.0 mm ..... 2  
– Costal margin of hind wing with 5–6 hamuli. Base of gonocoxite dorsally with or without impression. Usually smaller species: total body length 5.0–7.5 mm ..... 14
2. Gena flat. Preoccipital lateral carina well-developed ..... 3  
– Gena swollen. Preoccipital carina not developed ..... 8
3. Fore wing with two cubital cells. Tyloids weakly developed, narrowly semicircular across at most  $\frac{1}{4}$  of the basal flagellar surfaces (Fig. 2H). Body length 7.0–8.5 mm ..... *S. turneri* Cockerell, 1916  
– Fore wing with three cubital cells ..... 4
4. Tyloids covering entire ventral flagellar surface (Fig. 2G). Body length 7.0–8.5 mm .....  
..... *S. kershawi* Perkins, 1921  
– Ventral flagellar surface with medial glabrous spot or tyloids narrowly semicircular across basal flagellar surface ..... 5
5. T1 with marginal zone impunctate. Body length 7.0–8.5 mm ..... *S. laticeps* Meyer, 1920  
– T1 with marginal zone distinctly punctate (at least on a basal half) ..... 6
6. Wings with strong brownish darkening. Tyloids weakly developed, covering at most basal  $\frac{1}{4}$  of ventral flagellar surface and narrowly linear across lateral surface (Fig. 2D). Large species: total body length more 12.0 mm ..... *S. sikkimensis* Blüthgen, 1927  
– Wings hyaline, without darkening. Tyloids well developed, covering entire lateral flagellar surface and peripheral part of ventral surface (with medial glabrous spot, variable in size). Smaller species: total body length 7.0–8.5 mm ..... 7
7. Vertex more elevated, distance from top of head to upper margin of lateral ocellus ca two lateral ocellar diameters as seen in frontal view. Ocello-ocular area with confluent punctures (areolate-punctate). Metasomal terga coarser punctate (15–25  $\mu$ m). Body length 7.5–8.5 mm .....  
..... *S. invidus* (Cameron, 1897)  
– Vertex less elevated, distance from top of head to upper margin of lateral ocellus ca 1.5 lateral ocellar diameter as seen in frontal view. Ocello-ocular area with small shiny interspaces between

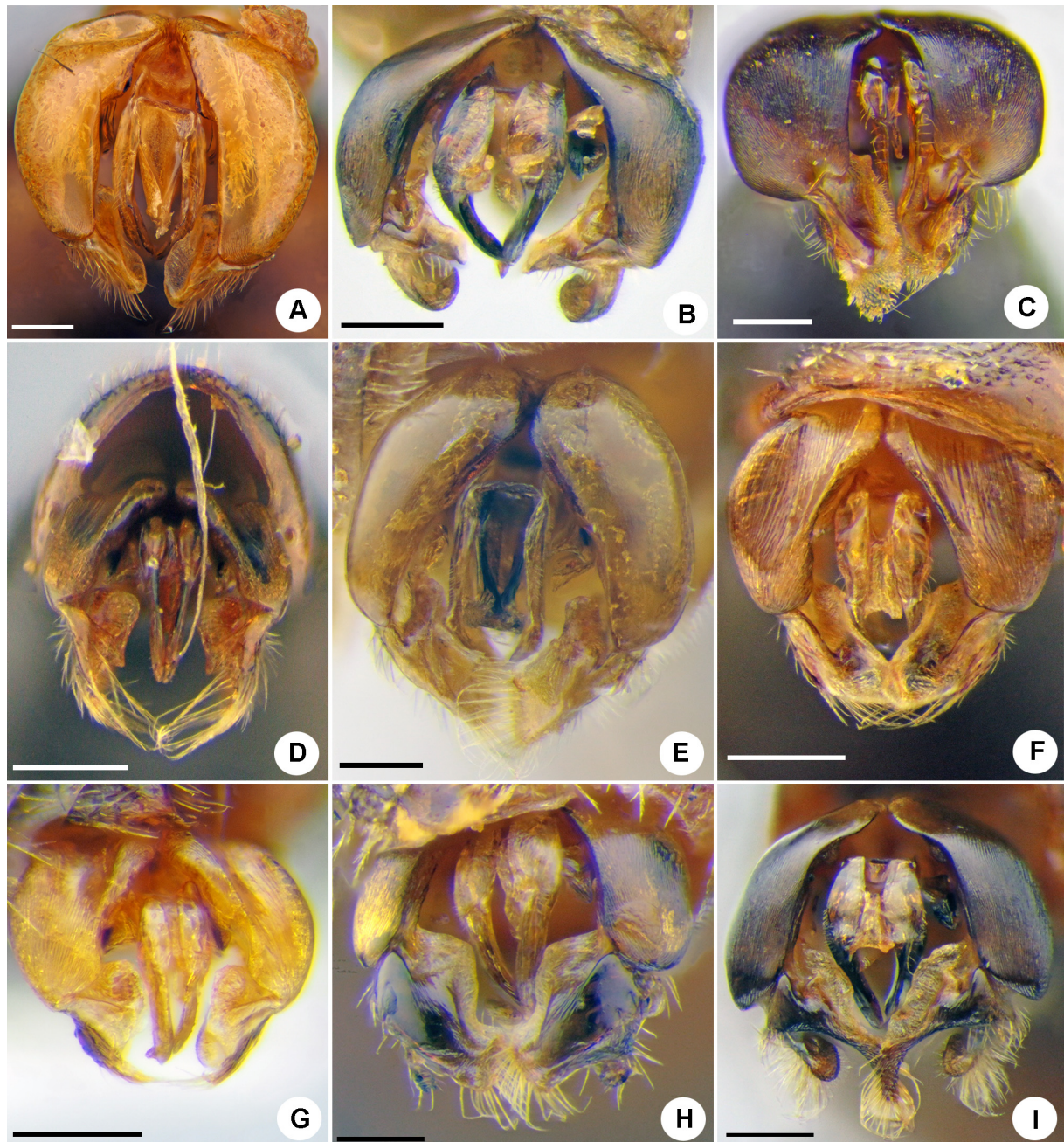
- punctures (at most a half puncture diameter). Metasomal terga finer punctate (10–20  $\mu\text{m}$ ). Body length 7.0 mm ..... *S. dissimilandus* (Cameron, 1897)
8. Head rounded, approximately as long as wide. Hind wing with basal vein strongly curved, the angle between basal (*M*) and cubital (*Cu*) veins ca 90°. T1 finely and sparsely (sometimes indistinctly) punctate. Gonostylus dorsally with small rectangular process directed to penis valve (Fig. 3B). Body length 7.0–10 mm ..... *S. monilicornis* (Kirby, 1802)
- Head transverse, wider than long. Hind wing with basal vein weakly curved, the angle between basal (*M*) and cubital (*Cu*) veins 70–80°. T1 coarsely and densely punctate. Gonostylus of another shape .  
..... 9
9. Mesoscutum densely punctate, with confluent punctures (areolate-punctate) ..... 10
- Mesoscutum sparser punctate, medially with punctures separated by at least a puncture diameter ..  
..... 11



**Fig. 2.** Antennae in lateral view, males. **A.** *Sphecodes hakkariensis* Warncke, 1992. **B.** *S. cameronii* (Bingham, 1897). **C.** *S. alternatus* Smith, 1853. **D.** *S. sikkimensis* Blüthgen, 1927. **E.** *S. gibbus* (Linnaeus, 1758). **F.** *S. rufiventris* (Panzer, 1798). **G.** *S. kershawi* Perkins, 1921. **H.** *S. turneri* Cockerell, 1916. Scale bars = 0.5 mm.



10. Head more transverse, 1.25–1.3 times as wide as long. Gonostylus longer, apically elongated into rounded process with long setae (Fig. 3E). Body length 9.0–12.0 mm .....  
..... *S. albilabris* (Fabricius, 1793)  
– Head less transverse, ca 1.2 times as wide as long. Gonostylus short, not enlarged apically (Fig. 3A).  
Body length 9.5–12 mm ..... *S. fumipennis* Smith, 1853



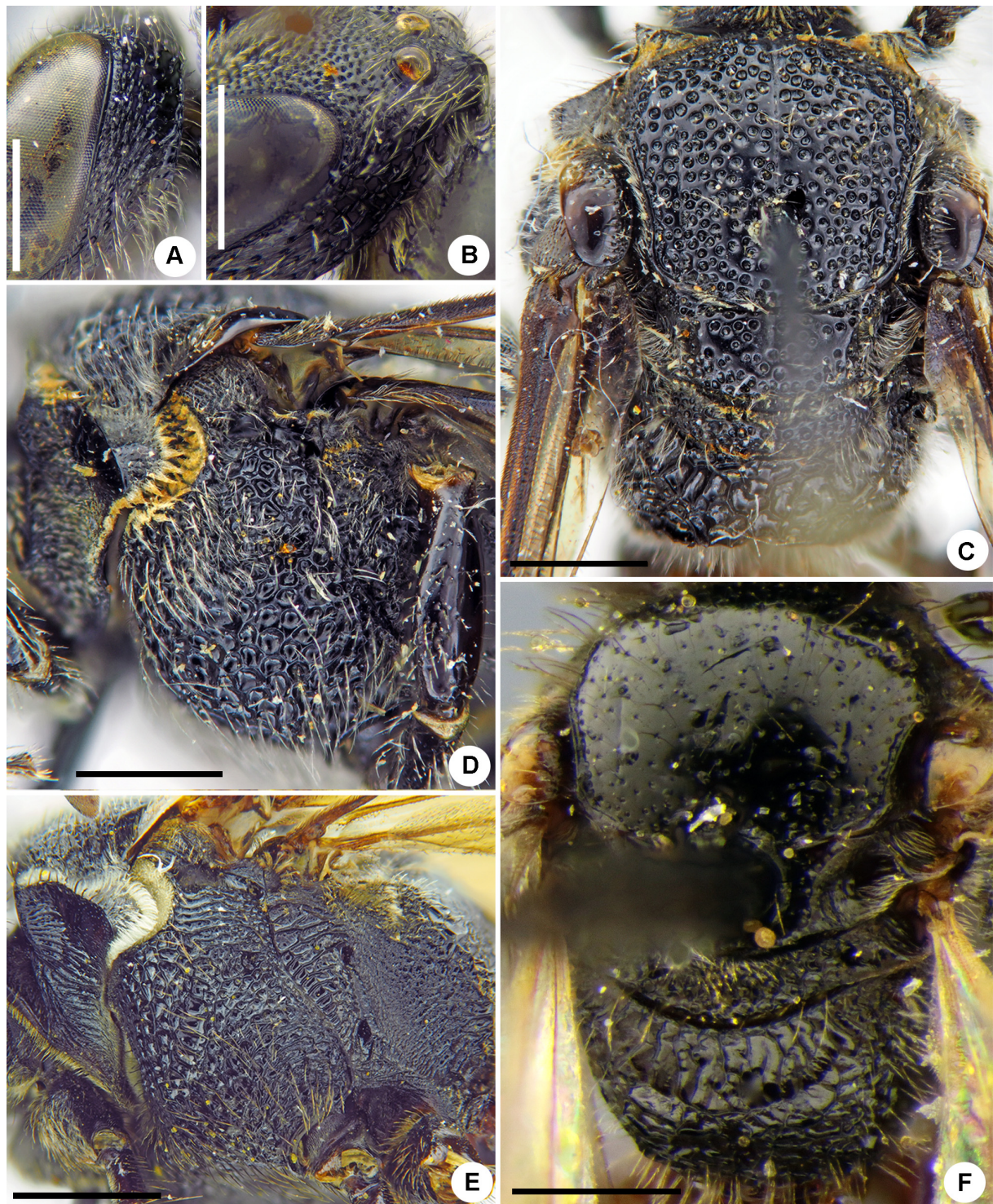
**Fig. 3.** Genitalia in dorsal view, males. **A.** *Sphecodes fumipennis* Smith, 1853. **B.** *S. monilicornis* (Kirby, 1802). **C.** *S. montanus* Smith, 1879. **D.** *S. hakkariensis* Warncke, 1922. **E.** *S. albilabris* (Fabricius, 1793). **F.** *S. intermedius* Blüthgen, 1923. **G.** *S. simlaensis* Blüthgen, 1924. **H.** *S. rufiventris* (Panzer, 1798). **I.** *S. gibbus* (Linnaeus, 1758). Scale bars = 0.25 mm.

11. Vertex long, distance from top of head to upper margin of lateral ocellus approximately three lateral ocellar diameters as seen in dorsal view. Tyloids usually well developed, covering at least entire lateral flagellar surface (with medial glabrous spot, variable in size, on ventral surface) ..... 12  
 – Vertex shorter, distance from top of head to upper margin of lateral ocellus ca two lateral ocellar diameters as seen in dorsal view. Tyloids weakly developed, covering basal  $1/7-1/3$  of ventral flagellar surface ..... 13
12. F3 long, ca 2 times as long as wide (Fig. 2E). Gonostylus elongate, with long apical process (Fig. 3I), apically less emarginated as seen in lateral view. Body length 7.0–14.0 mm .....  
 ..... *S. gibbus* (Linnaeus, 1758)  
 – F3 short, 1.1–1.3 times as long as wide (Fig. 2F). Gonostylus without apical process (Fig. 3H), apically more emarginate as seen in lateral view. Body length 6.0–8.0 mm .....  
 ..... *S. rufiventris* (Panzer, 1798)
13. Tyloids less developed, covering basal  $1/7-1/5$  of ventral flagellar surface (Fig. 2C). Body length 7.0–12.0 mm ..... *S. alternatus* Smith, 1853  
 – Tyloids more developed, covering basal  $1/5-1/3$  of ventral flagellar surface. Body length 10.0 mm ..  
 ..... *S. lasimensis* Blüthgen, 1927
14. T1 densely punctate. Gonostylus large, rectangular and weakly *S*-curved on inner margin (Fig. 3F). Body length 5.0–7.5 mm ..... *S. intermedius* Blüthgen, 1923  
 – T1 impunctate or with a few punctures. Gonostylus of another shape ..... 15
15. Tyloids well developed, on flagellomeres (at least from F3 onward) covering entire ventral surface ..... 16  
 – Tyloids weakly developed, covering at most basal  $1/4$  of ventral surface of last flagellomeres ..... 17
16. F2 with tyloids covering entire ventral surface (Fig. 2B). Hypoepimeral area entirely reticulate-rugose. Base of gonocoxite dorsally without impression, gonostylus leaf-shaped. Body length 5.0–5.5 mm ..... *S. cameronii* (Bingham, 1897)  
 – F2 glabrous, without tyloids (Fig. 2A). Hypoepimeral area medially smooth. Base of gonocoxite dorsally with impression, gonostylus trapezoidal (Fig. 3D). Body length 4.5–6.0 mm .....  
 ..... *S. hakkariensis* Warncke, 1992
17. Vertex with longitudinal carina (Fig. 4B). Lateral preoccipital carina present (Fig. 4A). Gonostylus with large rectangular membranous part (Fig. 3C). Body length 7.0–7.5 mm .....  
 ..... *S. montanus* Smith, 1879  
 – Vertex without longitudinal carina. Lateral preoccipital carina absent. Gonostylus smaller, of another shape ..... 18
18. Antennae shorter, with flagellomeres (from F3 onward) ca 1.1–1.2 times as long as wide. Gonostylus with triangular membranous part (Fig. 3G). Body length 5.0–5.5 mm .....  
 ..... *S. simlaensis* Blüthgen, 1924  
 – Antennae longer, with flagellomeres (from F3 onward) ca 1.3 times as long as wide. Gonostylus without membranous part. Body length 5.0 mm ..... *S. shillongensis* Blüthgen, 1927

#### Females

1. Costal margin of hind wing with 7–14 hamuli. Usually larger species: total body length 6.5–15.0 mm ..... 2  
 – Costal margin of hind wing with 5–6 hamuli. Usually smaller species: total body length 4.0–8.5 mm ..... 13



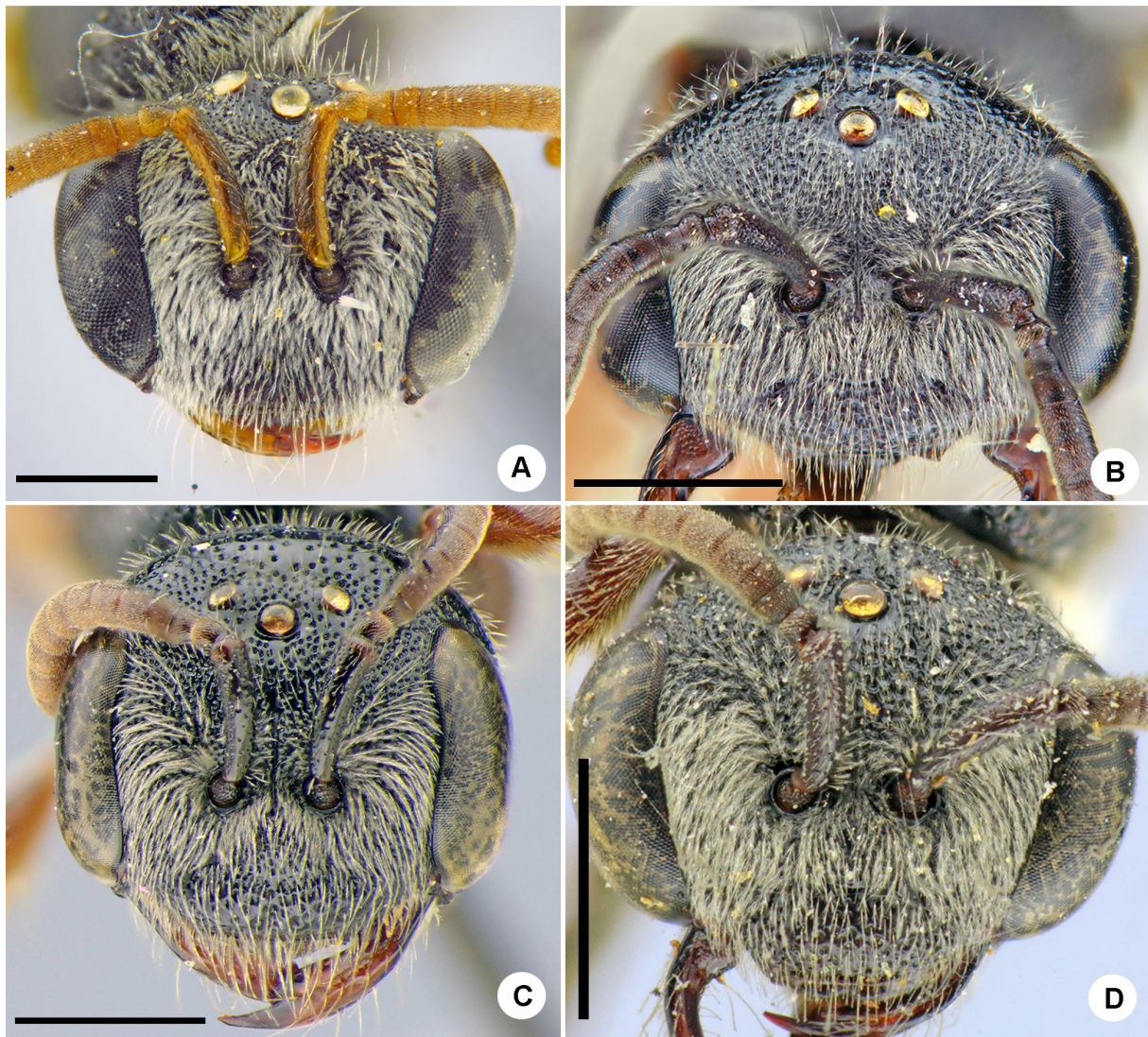


**Fig. 4.** Diagnostic characters of species of *Sphecodes*. **A–B.** Males. **C–F.** Females. **A.** Genal area and lateral preoccipital carina in lateral view. **B.** Vertex and longitudinal carina in dorso-lateral view. **C–F.** Mesosoma in dorsal (**C**, **F**) and lateral views (**D–E**). **A–B.** *S. montanus* Smith, 1879. **C–D.** *S. fumipennis* Smith, 1853. **E.** *S. albilabris* (Fabricius, 1793). **F.** *S. hakkariensis* Warncke, 1922. Scale bars = 1.0 mm.

2. Gena flat. Preoccipital lateral carina well-developed ..... 3  
 – Gena swollen. Preoccipital carina not developed ..... 7
3. Fore wing with two cubital cells. Body length 8.0–9.0 mm ..... *S. turneri* Cockerell, 1916  
 – Fore wing with three cubital cells ..... 4
4. Large species: total body length 12.0–14.0 mm. Costal margin of hind wing with 11–15 hamuli ....  
 ..... *S. sikkimensis* Blüthgen, 1927  
 – Smaller species: total body length 7.0–9.0 mm. Costal margin of hind wing with 6–9 hamuli ..... 5
5. Head strongly transverse (Fig. 5B), ca 1.3 times as wide as long. T1 impunctate. Body length 7.0–  
 8.0 mm ..... *S. laticeps* Meyer, 1920  
 – Head less transverse (Fig. 5D), ca 1.2 times as wide as long. T1 distinctly and densely punctate .. 6
6. Mesoscutum with coarse and confluent punctures, but medially with interspaces 0.5–1 puncture  
 diameter. Costal margin of hind wing with 8–9 hamuli. Pygidial plate as wide as metabasitarsus.  
 Body length 8.0–9.0 mm ..... *S. binghami* Blüthgen, 1924  
 – Mesoscutum mostly areolate-punctate. Costal margin of hind wing with 6–7 hamuli. Pygidial plate  
 0.7 times as wide as metabasitarsus. Body length 7.5–8.0 mm ..... *S. kershawi* Perkins, 1921
7. Mesoscutum densely punctate, with punctures separated by less than a puncture diameter (Fig. 4C)  
 ..... 8  
 – Mesoscutum sparsely punctate, medially with some punctures separated by at least two puncture  
 diameters (Fig. 4F) ..... 9
8. Paraocular areas with dense plumose pubescence, obscuring integument. Mesepisternum reticulate-  
 rugose (Fig. 4E). T1 densely punctate, with punctures separated by 0.5–2 puncture diameters. Body  
 length 9.0–15.0 mm ..... *S. albilabris* (Fabricius, 1793)  
 – Paraocular areas with relatively dense plumose pubescence, not obscuring integument. Mesepister-  
 num areolate (Fig. 4D). T1 sparsely punctate, with punctures separated by 2–6 puncture diameters.  
 Body length 9.5–12.0 mm ..... *S. fumipennis* Smith, 1853
9. Terga with marginal zones almost impunctate, on T1 only with a few tiny punctures. Body length  
 7.5–10.0 mm ..... *S. lasimensis* Blüthgen, 1927  
 – Terga with marginal zones distinctly punctate at least on T1 and T2 ..... 10
10. Vertex shorter, distance from top of head to upper margin of lateral ocellus ca two lateral ocellar  
 diameters as seen in dorsal view. Propodeum laterally reticulate-rugose. T3 with marginal zone  
 distinctly punctate. Body length 8.0–11.0 mm ..... *S. alternatus* Smith, 1853  
 – Vertex longer, distance from top of head to upper margin of lateral ocellus equal to 2.5–3.0 lateral  
 ocellar diameters as seen in dorsal view. Propodeum laterally strigate or reticulate-rugose. T3 with  
 marginal zone impunctate or punctate ..... 11
11. Head rounded-rectangular on upper margin, square-shaped as seen in frontal view (Fig. 5C); vertex  
 sparsely punctate, punctures mostly separated by more than a puncture diameter. Hind wing with  
 basal vein strongly curved, the angle between basal (*M*) and cubital (*Cu*) veins ca 90°. T1 indistinctly  
 punctate, with a few fine punctures. Pygidial plate 0.9–1.0 times as wide metabasitarsus. Body  
 length 7.0–10.0 mm ..... *S. monilicornis* (Kirby, 1802)  
 – Head uniformly rounded on upper margin, oval as seen in frontal view; vertex densely punctate,  
 punctures mostly separated by less than a puncture diameter. Hind wing with basal vein weakly



- curved, the angle between basal (*M*) and cubital (*Cu*) veins ca 70–80°. T1 distinctly punctate, with fine and coarser punctures. Pygidial plate 0.5–0.6 times as wide as metabasitarsus ..... 12
12. Mesepisternum strigate or strigate-rugose at least ventrally, sides of propodeum strigate. T3 with marginal zone coarsely punctate. Body length 6.5–8.5 mm ..... *S. rufiventris* (Panzer, 1798)  
 – Mesepisternum reticulate-rugose, sides of propodeum strigate or reticulate-rugose. T3 with marginal zone impunctate. Body length 7.0–15.0 mm ..... *S. gibbus* (Linnaeus, 1758)
13. Mandible simple (without an inner tooth) ..... 14  
 – Mandible bi-dentate ..... 15
14. Paraocular and supraclypeal areas with moderately dense pubescence, not obscuring integument. F1 and F2 as long as wide. Mesoscutum with punctures separated by at most a puncture diameter.



**Fig. 5.** Head in frontal view, females. **A.** *Sphecodes cameronii* (Bingham, 1897). **B.** *S. laticeps* Meyer, 1920. **C.** *S. monilicornis* (Kirby, 1802). **D.** *S. kershawi* Perkins, 1921. Scale bars = 1.0 mm.

- Metasomal terga (except almost impunctate T1) coarser punctate (10–15  $\mu\text{m}$ ). Pygidial plate as wide as metabasitarsus. Body length 5.5 mm ..... ***S. setiger*** Blüthgen, 1924
- Paraocular and supraclypeal areas with dense pubescence, obscuring integument (Fig. 5A). F1 and F2 0.6–0.7 times as long as wide. Mesoscutum finely and irregularly punctate with punctures separated by 1–5 puncture diameters. Metasomal terga finely punctate (3–10  $\mu\text{m}$ ). Pygidial plate 1.4–1.5 times as wide as metabasitarsus. Body length 5.0–5.5 mm ..... ***S. cameronii*** (Bingham, 1897)
15. Vertex with longitudinal carina. Lateral preoccipital carina present, but weakly developed. Pygidial plate wider, 1.1–1.2 times as wide as metabasitarsus. Body length 7.0–7.5 mm ..... ***S. montanus*** Smith, 1879
- Vertex without longitudinal carina. Lateral preoccipital absent. Pygidial plate narrower, at most as wide as metabasitarsus ..... 16
16. Pronotum rounded between the dorsal and lateral surfaces. Body length 7.0–7.5 mm (Fig. 6) ..... ***S. bluethgeni*** sp. nov.
- Pronotum between dorsal and lateral surfaces with sharp angle ..... 17
17. T1 distinctly punctate. Pygidial plate narrow, 0.4 times as wide as metabasitarsus. Body length 6.5–8.5 mm ..... ***S. intermedius*** Blüthgen, 1923
- T1 impunctate or with sparse tiny punctures. Pygidial plate wider, at least 0.7 times as wide as metabasitarsus ..... 18
18. Head strongly transverse, ca 1.3 times as wide as long. Metasomal terga entirely red ..... 19
- Head less transverse, ca 1.2 times as wide as long. T4 and T5 at least partially brownish or black ..  
..... 21
19. Smaller species: total body length 4.0 mm. Legs entirely black ..... ***S. almoransis*** Gupta & Saini, 2018
- Larger species: total body length 6.5–8.0 mm. Legs entirely red or at least tarsi red or yellow .... 20
20. Mesoscutum denser punctate, with punctures separated by 1–2 puncture diameters. Pygidial plate as wide as metabasitarsus. Body length 6.5 mm ..... ***S. perplexus*** Nurse, 1903
- Mesoscutum sparser punctate, with punctures separated by 2–5 puncture diameters. Pygidial plate 0.8 times as wide as metabasitarsus. Body length 8.0 mm ..... ***S. tantalus*** Nurse, 1903
21. Mesoscutum sparsely punctate, with punctures separated by 2–6 puncture diameters (Fig. 4F). Hypoepimeral area medially smooth. Body length 4.5–5.0 mm ..... ***S. hakkariensis*** Warncke, 1992
- Mesoscutum denser punctate, with punctures separated by 1–4 puncture diameters. Hypoepimeral area entirely rugose ..... 22
22. Head less transverse, 1.1 times as wide as long. Legs entirely red. Body length 4.5 mm ..... ***S. iridipennis*** Smith, 1879
- Head more transverse, 1.2 times as wide as long. At least femora black or brownish. Body length 5.0–6.5 mm ..... ***S. simlaensis*** Blüthgen, 1924



## Himalayan species

Class Insecta Linnaeus, 1758  
Order Hymenoptera Linnaeus, 1758  
Family Halictidae Thomson, 1869  
Tribe Halictini Thomson, 1869  
Genus *Sphecodes* Latreille, 1804

### *Sphecodes albilabris* (Fabricius, 1793) Figs 3E, 4E

- Nomada albilabris* Fabricius, 1793: 349, ♀, ♂ (type locality: Germany).  
*Dichroa fuscipennis* Germar, 1819: 18, ♀ (type locality: Germany).  
*Sphecodes latreillei* Wesmael, 1835: 285, ♀, ♂ (type locality: Belgium).  
*Sphecodes nigripes* Lepeletier de Saint Fargeau, 1841: 542, ♀, ♂ (type locality: France).  
*Sphecodes rugosus* Smith, 1848: 2209, ♂ (type locality: England).  
*Sphecodes nodicornis* Gistel, 1857: 554, ♀, ♂ (type locality: Germany).  
*Sphecodes fuscipennis* var. *basalis* Dalla Torre, 1877 (nom. praeocc., nec Sichel 1865): 185, ♀ (type locality: Italy).  
*Sabulicola cirsii* Verhoeff, 1890: 329, ♂ (type locality: Germany).  
*Sphecodes grandis* Meyer, 1922: 173, ♂ (type locality: Northeast India).  
*Sphecodes rufipennis* Cockerell, 1931a: 348, ♂ (type locality: Morocco).  
*Sphecodes atrescens* Cockerell, 1931a: 350, ♂ (type locality: Morocco).

*Sphecodes albilabris* – Astafurova & Proshchalykin 2017b: 251.

#### Diagnosis and descriptive notes

See Astafurova *et al.* (2018a: 5).

#### Material examined

INDIA • 1 ♂; Himachal Pradesh, Tabo; 2800 m a.s.l.; 11 Jul. 2001; V. Major leg.; PCMS.

NEPAL • 1 ♀; Mustang Distr., Purano Marpha; 3200 m a.s.l.; 9–11 May 1995; Iglesias leg.; PCMS.

#### Distribution

Himalayas: Tajikistan (Gorno-Badakhshan Province), India (\*Himachal Pradesh), \*Nepal; North Africa, Europe (north to Finland and Sweden), Russia (east to Primorsky Terr.), Turkey, Caucasus, Kazakhstan, Central Asia, Iran, North and North East China, India (Uttar Pradesh).

### *Sphecodes binghami* Blüthgen, 1924

*Sphecodes binghami* Blüthgen, 1924: 497, ♀.

#### Diagnosis and descriptive notes

See Astafurova *et al.* (2020b: 37).

#### Material examined

##### Holotype

MYANMAR • ♀; Pegu Hills; Mar. 1889; Bingham leg.; NHMUK 010576231.

### Other material

NEPAL • 1 ♀; Kali-Gandaki-Kola, Tatopani, 50 km SW of Pokhara; 28°20' N, 83°30' E; 1100–1200 m a.s.l.; C. Holzschuh leg.; PCMS.

### Distribution

Himalayas: \*Nepal; Myanmar, Malaysia.

### *Sphecodes bluethgeni* sp. nov.

urn:lsid:zoobank.org:act:E7F25913-AF79-4CC7-8E33-B6470F31813F

Figs 6, 7A–D

### Diagnosis

Like members of the Palearctic *hyalinatus* species group (see Astafurova & Proshchalykin 2017a) the new species has a pronotum rounded between the dorsal and lateral surfaces, but it clearly differs by the presence of a sharp carina between the lateral and vertical surfaces of the propodeum (Fig. 7D). From *S. engeli* Astafurova & Proshchalykin, 2020, another Oriental species of this group, the new species differs by the shape of the head with a rounded vertex as seen in frontal view (vs the head with a straight upper margin in *S. engeli*).

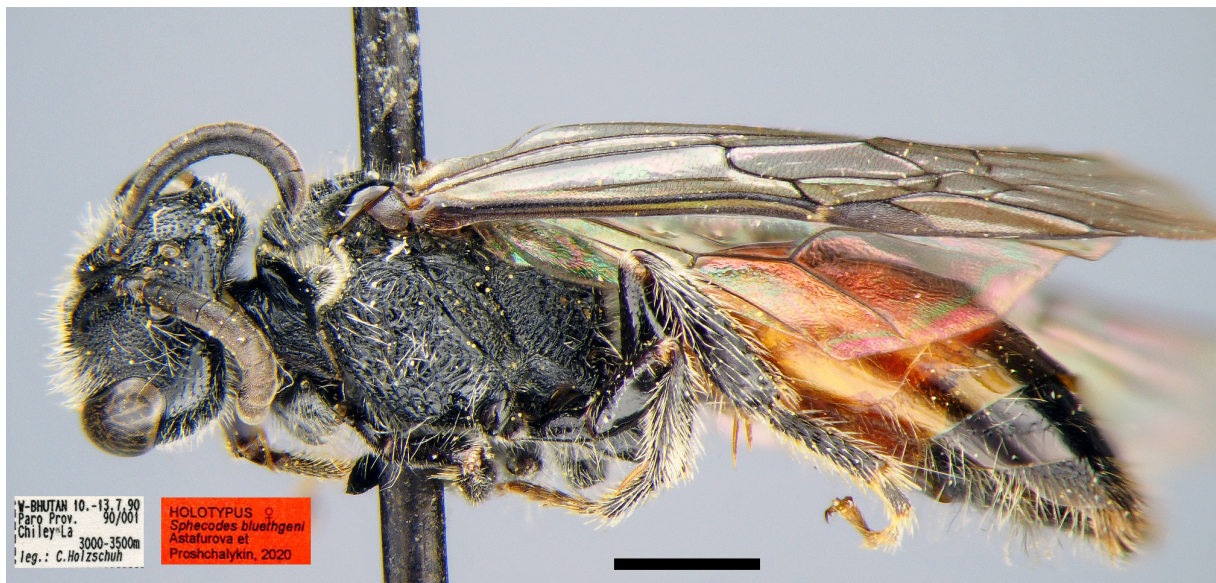
### Etymology

This species is dedicated to famous German entomologist Paul Blüthgen (1880–1967), in recognition of his significant contributions to the study of bees and wasps.

### Material examined

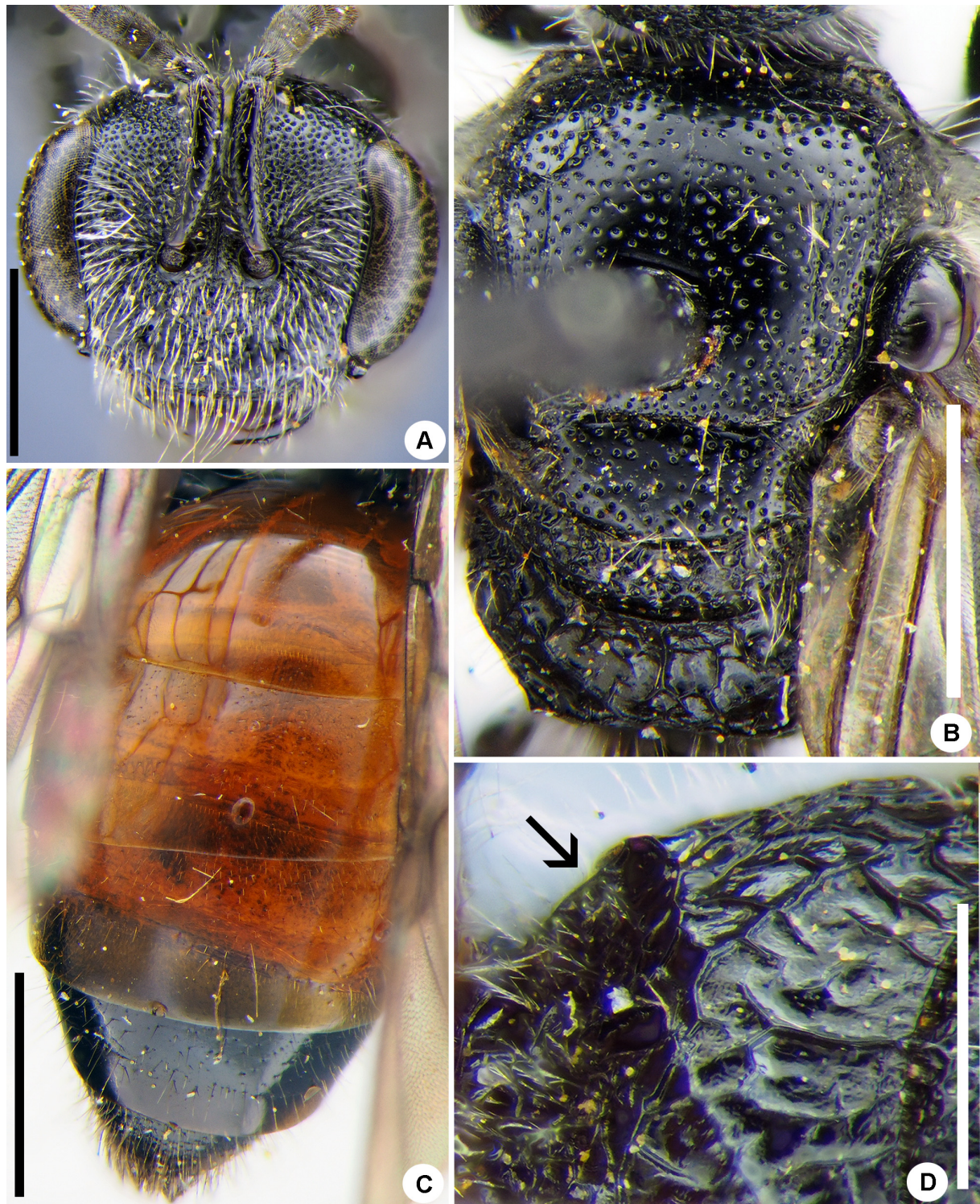
#### Holotype

BHUTAN • ♀; Paro Prov., Chiley La; 3000–3500 m a.s.l.; 10–13 Jul. 1990; C. Holzschuh leg.; PCMS/OLBL.



**Fig. 6.** *Sphecodes bluethgeni* sp. nov. Holotype, ♀ (PCMS/OLBL). Habitus in lateral view and labels. Scale bar = 1 mm.





**Fig. 7.** *Sphecodes bluethgeni* sp. nov. Holotype, ♀ (PCMS/OLBL). **A.** Head in frontal view. **B.** Mesosoma in dorsal view. **C.** Metasoma in dorsal view. **D.** Propodeum in dorso-lateral view. Scale bars = 1 mm.

### Paratype

BHUTAN • 1 ♀; Thimpu Distr., Taba; 2600 m a.s.l.; 14–17 Jul. 1988; C. Holzschuh leg.; ZISP.

### Description

#### Female (Fig. 6, holotype)

MEASUREMENTS. Total body length 7.0–7.5 mm; forewing length (without tegula) 5.8–6.0 mm.

HEAD. Black (Fig. 7A); transverse, ca 1.25 times as wide as long; preoccipital carina absent; vertex weakly elevated, distance from top of head to upper margin of a lateral ocellus approximately a lateral ocellar diameter as seen in frontal view and ca 2.5 diameters as seen in dorsal view; mandible bi-dentate; labrum semi-oval, 0.5 times as long as basal width; F1 0.7 times as long as wide; F2 0.8–0.9 times as long as wide; F3 0.9–1.0 times as long as wide; gena wide, 1.1 times as wide as eye; supraclypeal area weakly bulging; clypeus with punctures separated by at most a half puncture diameter; frons, paraocular and supraclypeal areas with confluent punctures (20–25 µm); ocello-ocular area with punctures separated by 0.5–2 puncture diameters (Fig. 7A), vertex behind ocelli shiny with sparse punctures; gena shiny, with dense setal pores; face (below antennal sockets) and gena with sparse and thin setae.

MESOSOMA. Mesosoma (including legs) black (Fig. 7B); wings with weak brownish darkening, veins and stigma brown; hind wing with angle between basal (*M*) and cubital (*Cu*) veins ca 90°, costal margin with six hamuli; pronotum rounded between dorsal and lateral surfaces; mesoscutum and mesoscutellum with punctures (25–30 µm) separated by 0.5–4 puncture diameters; metafemur enlarged in proximal half, maximum width 0.4 times its length; hypoepimeral area, mesepisternum and lateral parts of propodeum reticulate-rugose; propodeal triangle (metapostnotum) with coarse winding wrinkles and large shiny, finely granulate interspaces (Fig. 7B, D).

METASOMA. T1 almost impunctate, with a few fine punctures along marginal zone (Fig. 7C); remaining terga basally with sparse and fine punctures (5–10 µm); marginal zones impunctate; pygidial plate dull, pointed apically, narrow, 0.8–0.9 times as wide as metabasitarsus; T1–T3 red; sterna tessellate, with tiny shallow setal pores (sparse on S2 and denser on S3–S5).

#### Male

Unknown.

### Distribution

Bhutan.

### *Sphecodes cameronii* (Bingham, 1897)

Figs 2B, 5A

*Halictus decorus* Cameron, 1897: 94, ♀ (nom. praeocc., nec *Halictus decorus* Walker, 1871).

*Halictus cameronii* Bingham, 1897: 432, replacement name for *H. decorus* Cameron, 1897 (nec *H. decorus* Walker, 1871).

*Sphecodes armeniacus* Warncke, 1992: 19, ♀, ♂. **Syn. nov.**

*Sphecodes decorus* – Cameron 1897: 94. — Gupta 2013: 60.

*Sphecodes cameronii* – Cockerell 1921: 360. — Ascher & Pickering 2020: map.

### Diagnosis and descriptive notes

See Astafurova *et al.* (2018a: 9, as *S. armeniacus* Warncke, 1992).

### Material examined

INDIA • 1 ♀, syntype of *Halictus decorus* Cameron, 1897; “Mussouri [Mussoorie, Uttarakhand, India] // *Sphecodes* // 999. // *Halictus decorus* Cameron, Type // Type Hyme 1956, *Halictus decorus* Cameron, 1897, Paralectotype [actually without this status], ♂, Hope Ent Coll.”; OUMNH • 2 ♂♂; N. India, Pali; 5 Mar. 1997; K.M. Guichard leg.; NHMUK 013380471, NHMUK 013380451.

NEPAL • 1 ♀; Rapti Tal, Monahari Khola, Belwa; 350 m a.s.l.; 10 May 1967; Dierl-Forster-Schacht leg.; PCMS.

TURKEY • 1 ♀, holotype of *Sphecodes armeniicus*; Kars, Tuzluca; OLBL/PCMS.

### Distribution

Himalayas: \*Nepal, India (Uttarakhand); Turkey, South Kazakhstan, Turkmenistan, India (Pali), Sri Lanka (Inoka *et al.* 2005).

### *Sphecodes dissimilandus* (Cameron, 1897)

Fig. 8A–D

*Halictus dissimilandus* Cameron, 1897: 95, ♀ [♂].

*Sphecodes dissimulandus* – Blüthgen 1927: 90 (incorrect spelling).

*Sphecodes dissimilandus* – Ascher & Pickering 2020: map.

### Diagnosis

The male of this species is similar to *S. invidus* owing to a similar shape of antennal tyloids (well developed, covering entire lateral flagellar surface and a part of ventral one), sculpture and coloration of the body, including hyaline wings, the areolate mesoscutum, the densely punctate T1 on the disc and the marginal zone. The species clearly differs from *S. invidus* by the weaker elevated vertex as seen in frontal view, with distance from top of head to upper margin of lateral ocellus ca 1.5 lateral ocellar diameter (vs 2 in *S. invidus*) and the finer punctate metasoma (10–20 µm vs 15–25 µm).

### Material examined

#### Holotype

INDIA • ♂; “Mussouri 74[Mussoorie, Uttarakhand, India], Rothney [leg.]”; “*Sphecodes* // 998. // *Halictus dissimilandus* Cameron, Type // Type Hyme 1957, *Halictus dissimilandus* Cameron, 1897, Holotype, ♂, Hope Ent Coll.”; OUMNH.

### Descriptive notes

Wings hyaline, without darkening; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins ca 80°, costal margin with seven hamuli. Lateral preoccipital carina present.

#### Male

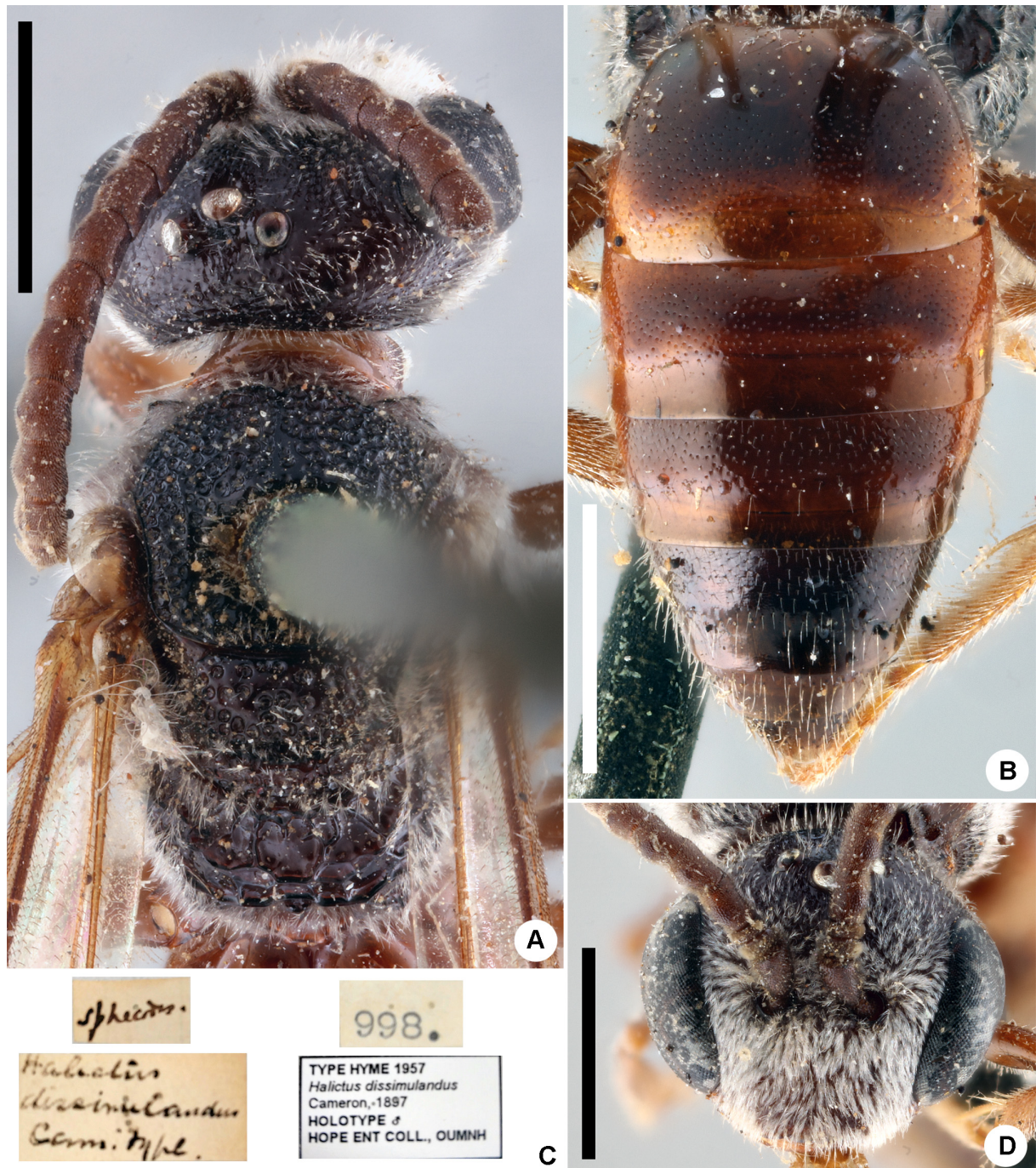
Total body length 7 mm. Head transverse, ca 1.2 times as wide as long (Fig. 8D); vertex elevated with distance from top of head to upper margin of lateral ocellus ca 1.5 lateral ocellar diameter as seen in frontal view and ca 2 as seen in dorsal view (Fig. 8A); antennae attain mesoscutellum, flagellomeres (from F2 onward) 1.2–1.3 times as long as wide, tyloids well developed, covering entire lateral flagellar surface and most part (from F4 onward) of ventral one (with small medial glabrous spot); ocello-ocular area close to areolate, with dense punctures separated by at most a half puncture diameter; face with dense plumose pubescence, below antennal sockets obscuring integument. Mesoscutum areolate-



punctate (30–50  $\mu\text{m}$ ), mesoscutellum with interspaces equal to at most 2 puncture diameters (Fig. 8A); propodeal triangle (metapostnotum) shorter than mesoscutellum, roughly rugose; mesepisternum coarsely reticulate-rugose; legs red. Metasomal terga finely punctate (10–20  $\mu\text{m}$  / 1–4), T1 marginal zone punctured basally, T2–T5 marginal zones impunctate; metasoma entirely red (Fig. 8B).

**Female**

Unknown.



**Fig. 8.** *Sphcodes dissimilandus* (Cameron, 1897). Holotype, ♂ (OUMNH). **A.** Head and mesosoma in dorsal view. **B.** Metasoma in dorsal view. **C.** Labels. **D.** Head in frontal view. Scale bars = 1 mm.

### Distribution

Himalayas: India (Uttarakhand).

### *Sphecodes fumipennis* Smith, 1853

Figs 3A, 4C–D

*Sphecodes fumipennis* Smith, 1853: 36, ♀ (holotype: ♀, N. India, coll. J.S. Baly; London, NHMUK; not examined).

*Sphecodes fumipennis* – Blüthgen 1924: 489; 1927: 55. — Ascher & Pickering 2020: map.

### Diagnosis and descriptive notes

See Astafurova *et al.* (2020b: 55).

### Material examined

INDIA • 1 ♀, 1 ♂; Sikkim; Bingham leg. [*Sph. fumipennis* Smith, Blüthgen det.]; ZMHB.

### Distribution

Himalayas: India (Sikkim); Myanmar, Laos, China (Sichuan, Yunnan).

### *Sphecodes gibbus* (Linnaeus, 1758)

Figs 2E, 3I

*Sphecodes gibba* Linnaeus, 1758: 571, ♀ (type locality: Sweden).

*Apis glabra* Füssly, 1775: 51, ♀ (type locality: Switzerland).

*Andrena ferruginea* Olivier, 1789: 139, nom. nov. for *Nomada gibba* Fabricius, 1775 (nom. praeocc., nec Linnaeus, 1758).

*Apis gibbosa* Christ, 1791: 177, nom. nov. for *Nomada gibba* Fabricius, 1775 (nom. praeocc., nec Linnaeus, 1758).

*Melitta sphecodes* Kirby, 1802: 46, ♀ (type locality: England).

*Melitta picea* Kirby, 1802: 48, ♂ (type locality: England).

*Andrena austriaca* Fabricius, 1804: 325, ♀ (type locality: Denmark) (nom. praeocc., nec Panzer, 1798).

*Dichroa analis* Illiger, 1806: 48, nomen novum for *Nomada gibba* Fabricius, 1775 (nom. praeocc., nec Linnaeus, 1758).

*Sphecodes apicatus* Smith, 1853: 36, ♀ (syntypes: ♀, India, Simla; NHMUK). Synonymized by Blüthgen 1927: 27.

*Sphecodes nigripennis* Morawitz, 1876: 257, ♀ (type locality: Kazakhstan).

*Sphecodes indicus* Bingham, 1898: 123, pl. a, fig. 10, ♂. **Syn. nov.**

*Sphecodes sutor* Nurse, 1903: 538, ♀ (syntypes: ♀♀, India, Jammu and Kashmir; NHMUK). Synonymized by Blüthgen 1927: 27.

*Sphecodes gibbus* var. *rufispinosus* Meyer, 1920: 113, ♀ (type locality: Spain).

*Sphecodes gibbus* var. *turkestanicus* Meyer, 1920: 113, ♀, ♂ (type locality: Uzbekistan, “Golodnaja Steppe”; China: Jarkand, Xinjiang).

*Sphecodes castilianus* Blüthgen, 1924: 473, ♀ (type locality: Portugal).

*Sphecodes lustrans* Cockerell, 1931b: 411, ♂ (type locality: Morocco).

*Sphecodes angarensis* Cockerell, 1937: 3–4, ♀ (type locality: Russia, Irkutsk Prov.).

*Sphecodes pergibbus* Blüthgen, 1938: 50, ♀, ♂ (type locality: Cyprus).



*Sphecodes indicus* – Saini & Rathor 2012: 162. — Rajkumar & Dey 2016: 1841.

*Sphecodes gibbus* – Ascher & Pickering 2020: map.

### Diagnosis and descriptive notes

See Astafurova *et al.* (2018a: 17).

### Material examined

INDIA • 1 ♂, holotype of *Sphecodes indicus* Bingham, 1898; “Type // Simla, 5. 97. // *Sphecodes indicus* (Bingh) // B.M.Type HYM 17a560”; NHMUK 013380329 • 1 ♀; Simla; May 1898; C.G. Nurse leg.; NHMUK 013380335.

### Distribution

Himalayas: India (Jammu and Kashmir, Himachal Pradesh); North Africa, Europe (north to 63° latitude), Russia (east to Yakutia), Turkey, Israel, Jordan, Caucasus, Kazakhstan, Central Asia, Iran, Mongolia, China (Xinjiang).

### Remarks

The record of *S. indicus* from Mussoorie (Uttarakhand, India) by Saini & Rathor (2012: 162) is doubtful.

### *Sphecodes invidus* (Cameron, 1897)

*Halictus invidus* Cameron, 1897: 96, ♀ [♂].

*Sphecodes nigrobasalis* Meyer, 1922: 172, ♂. **Syn. nov.**

*Sphecodes invidus* – Ascher & Pickering 2020: map.



**Fig. 9.** *Sphecodes invidus* (Cameron, 1897) (holotype of *S. nigrobasalis* Meyer, 1922), ♂ (ZMHB). Habitus in lateral view and labels. Scale bar = 1 mm.



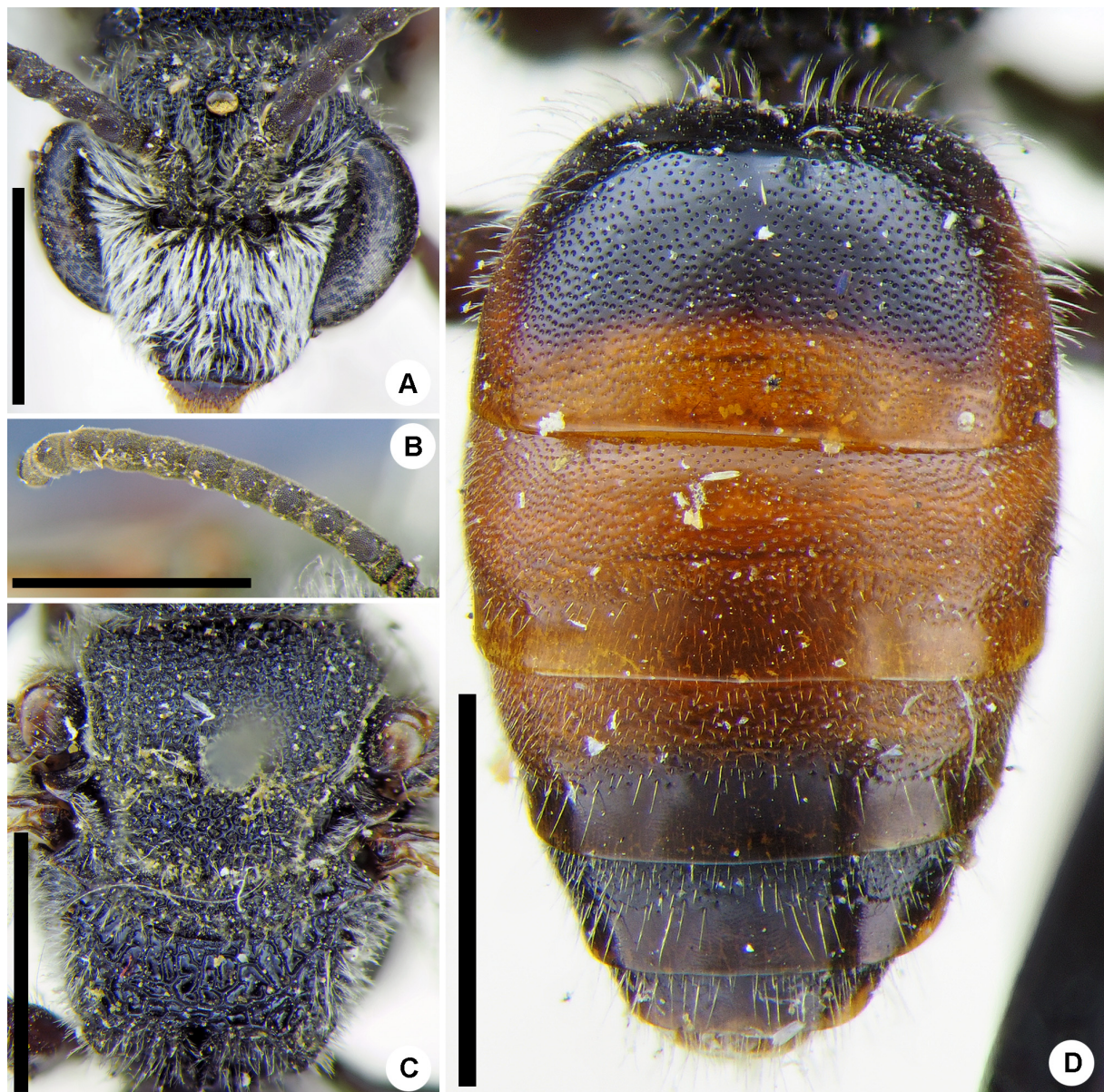
### Diagnosis

The male of this species is similar to that of *S. dissimilandus* (refer to Diagnosis for *S. dissimilandus*, above).

### Material examined

#### Syntype

INDIA • 1 ♂; “1000. // Mussoorie [Uttarakhand, India], Rothney [leg.] // *Halictus invidus* Cameron, Type // Type Hyme 1958, *Halictus invidus* Cameron, 1897, Holotype, ♂, Hope Ent Coll.”; OUMNH.



**Fig. 10.** *Sphecodes invidus* (Cameron, 1897) (holotype of *S. nigrobasalis* Meyer, 1922), ♂ (ZMHB). A. Head in frontal view. B. Antenna in lateral view. C. Mesosoma in dorsal view. D. Metasoma in dorsal view. Scale bars = 1.0 mm.

### Other material

INDIA • 1 ♂, holotype of *S. nigrobasalis* Meyer, 1922; “Assam [India], Shillong 6.03., coll. Bingham // *Sphec. nigrobasalis* n. scec., Dr. R. Meyer det., Type!”; ZMHB (Figs 9, 10A–D).

### Descriptive notes

Wings hyaline, with weak yellowish darkening; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins ca 80°, costal margin with eight or nine hamuli. Lateral preoccipital carina present.

### Male

Total body length 7.5–8.5 mm. Head transverse, ca 1.2 times as wide as long; vertex well elevated with distance from top of head to upper margin of lateral ocellus approximately two lateral ocellar diameters as seen in frontal view and ca 3 as seen in dorsal view; antennae attain mesoscutellum, flagellomeres (from F2 onward) 1.2–1.3 times as long as wide, tyloids well developed, covering entire lateral flagellar surface and peripheral part of ventral one (with medial glabrous spot); ocello-ocular area areolate; face with dense plumose pubescence, below antennal sockets obscuring integument. Mesoscutum areolate-punctate (30–50 µm), mesoscutellum areolate with a few interspaces of at most a puncture diameter; propodeal triangle (metapostnotum) shorter than mesoscutellum, roughly reticulate-rugose; mesepisternum coarsely reticulate-rugose; legs red-brown. Metasomal terga densely punctate (15–25 µm / 0.5–3), T1 marginal zone punctured barely finer than on disc, impunctate along posterior margin; T2–T5 marginal zones impunctate; T1 red apically, T2–T3 mostly red.

### Female

Unknown.

### Distribution

India (Uttarakhand, Meghalaya).

### *Sphecodes iridipennis* Smith, 1879

Fig. 11A–E

*Sphecodes iridipennis* Smith, 1879: 27–28, ♀.

*Sphecodes iridipennis* – Gupta 2013: 60.

### Diagnosis

This species is close to the *S. simlaensis* owing to a similar structure, sculpture of the body and the fact that the females morphologically are difficult to distinguish, but *S. iridipennis* has a slightly less transverse head (1.1 times as wide as long vs 1.2) and entirely red legs (at least femora black or brownish in *S. simlaensis*).

### Material examined

#### Holotype

INDIA • 1 ♀; “Type // N Ind [Northern India] // B.M.TYPE HYM.17a550”; NHMUK 013380317.

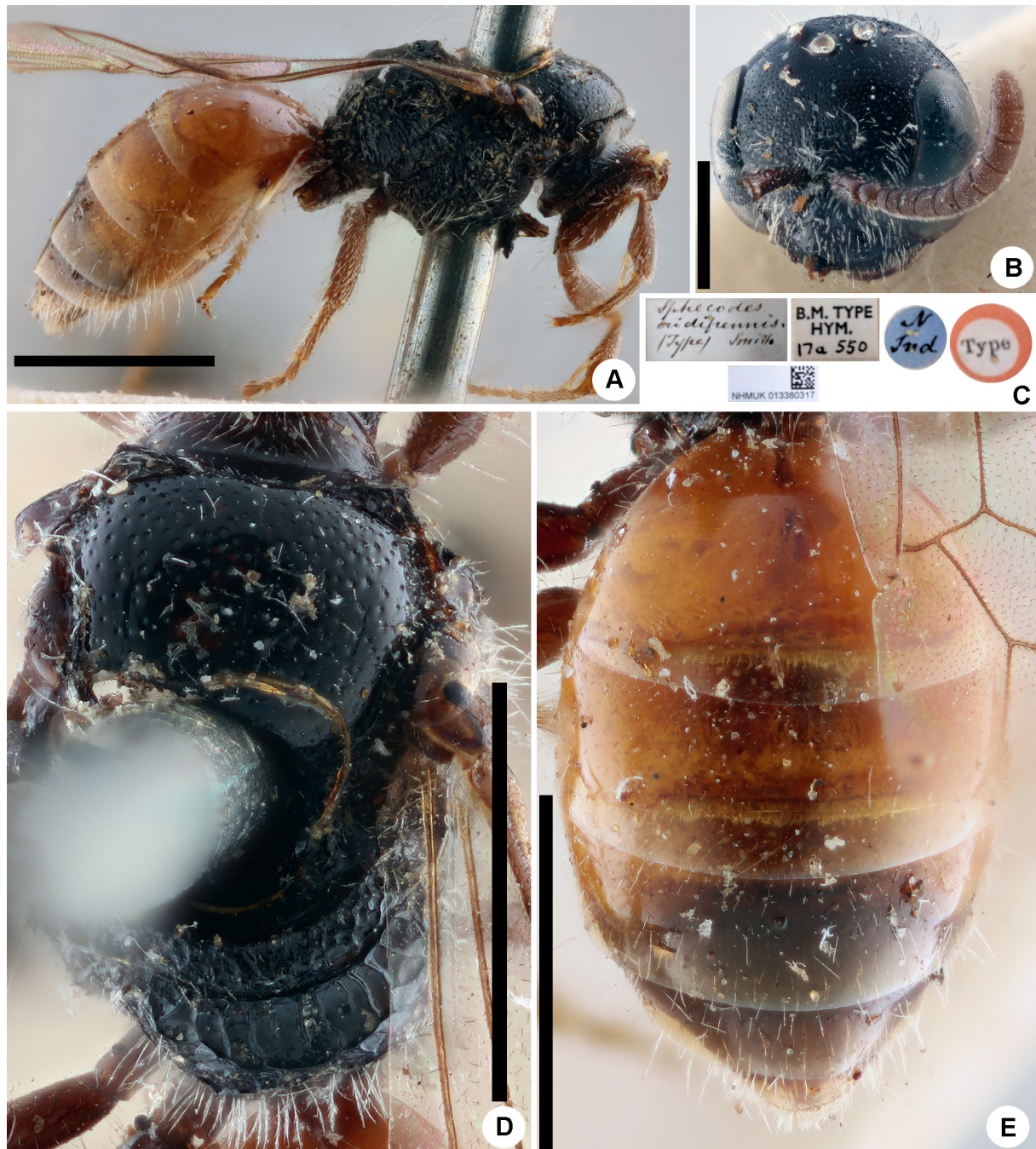
### Descriptive notes

Wings with weak yellowish or brownish darkening; hind wing with basal vein strongly curved with the angle between basal (*M*) and cubital (*Cu*) veins ca 90°, costal margin with five hamuli. Preoccipital carina absent.



**Female**

Total body length 4.5 mm (Fig. 11A). Head weakly transverse, at most 1.1 times as wide as long (Fig. 11B); vertex not elevated as seen in frontal view; F1 and F2 transverse, 0.5–0.6 times as long as wide, F3 0.8 times as long as wide; clypeus with punctures separated by 1–3 puncture diameters; ocello-ocular area with fine punctures separated by 1–3 puncture diameters; face and gena with sparse



**Fig. 11.** *Sphecodes iridipennis* Smith, 1879. Holotype, ♀ (NHMUK 013380317). **A.** Habitus in lateral view. **B.** Head in frontal view. **C.** Labels. **D.** Mesosoma in dorsal view. **E.** Metasoma in dorsal view. Scale bars: A, D–E = 1 mm; B = 0.5 mm.

pubescence. Mesoscutum and mesoscutellum with punctures (15–20 µm) separated by 1–4 puncture diameters (Fig. 11D); hypoepimeral area coarsely reticulate; metafemur weakly enlarged in proximal half, maximum width 0.35 times its length; legs red. Propodeal triangle (metapostnotum) with coarse longitudinal wrinkles and shiny interspaces. Metasomal terga scarcely punctate, T1 impunctate, remaining terga basally with sparse fine setal pores (Fig. 11E); marginal zones impunctate; terga red to red-brownish apically, pygidial plate 0.7 times as wide as metabasitarsus.

#### **Male**

Unknown.

#### **Distribution**

Himalayas: Uttarakhand, Northern India. The record of the species from Himachal Pradesh (India) by Saini & Rathor (2012: 162) is doubtful.

#### **Remarks**

Since we could not clearly differentiate between females of *S. iridipennis* and *S. simlaensis*, except by their relative head length and coloration, more specimens should be studied (including the male finding) to make a decision on their synonymy.

The specimens recorded as *S. iridipennis* from Chapra (India) by Rajkumar & Dey (2016: 1847, pl. 3) belong to another species. Unlike the holotype this specimen, re-described as *S. iridipennis*, has more transverse head (1.3 times as wide as long) and possibly belongs to the undescribed female of *S. chaprensis* Blüthgen, 1927.

### *Sphcodes kershawi* Perkins, 1921

Figs 2G, 5D

*Sphcodes kershawi* Perkins, 1921: 9, ♂.

*Sphcodes javanensis* Blüthgen, 1927: 69–70, ♂. Synonymized by Astafurova *et al.* 2020b: 62.

#### **Diagnosis and descriptive notes**

See Astafurova *et al.* (2020b: 63–64).

#### **Material examined**

##### **Syntypes**

CHINA • 1 ♂, syntype; China, Macao, J.C. Kershaw leg.; NHMUK • 1 ♂, syntype; same collection data as for preceding; ZMHB.

##### **Other material**

INDIA • 1 ♀; Uttarakhand, Uttarkashi; 30°73' N, 78°45' E; 1235 m a.s.l.; 25 Apr.–2 May 2012; K. Tomkovich leg.; ZMMU.

INDONESIA • 1 ♂, holotype of *Sphcodes javanensis* Blüthgen, 1927; Java, Buitenzorg; Aug. 1920; NHMW.

#### **Distribution**

Himalayas: India (\*Uttarakhand); China (Macao), Myanmar, Malaysia.



*Sphecodes lasimensis* Blüthgen, 1927

Figs 12, 13A–C

*Sphecodes lasimensis* Blüthgen, 1927: 40, fig. 6a–e, ♀, ♂ (syntypes: ♀, ♂, N India: Simla, 7000 ft, Annandale leg. 16./5/1909; Simla Hills, 9000 ft, Annandale u. Kemp leg. 18–21./5.1916; ?The Indian Museum, Calcutta; not examined).

*Sphecodes lasimensis* – Ascher & Pickering 2020: map.

**Diagnosis**

The female is closest to that of *S. gibbus* by the shape of the head and sculpture of the body, but differs from this species by the less elevated vertex with distance from top of head to upper margin of lateral ocellus approximately two lateral ocellar diameters as seen in frontal view (vs ca 3), the sparser punctate metasoma with almost impunctate marginal zones on T1 and T2 (distinctly punctate in *S. gibbus*) and on average smaller body length 7.5–10 mm (vs 7–15 mm). We have not studied the male, but according to the description of Blüthgen (1927) it is similar to that of the Palearctic *S. alternatus* Smith, 1853 and *S. reticulatus* Thomson, 1870 owing to similar sculpture, shapes of antennal tyloid area and gonostylus (tyloids of *S. lasimensis* are more developed and semicircular across basal  $\frac{1}{5}$ – $\frac{1}{3}$  of ventral flagellar surface vs  $\frac{1}{7}$ – $\frac{1}{5}$  in *S. alternatus* and *S. reticulatus*).

**Material examined**

NEPAL • 2 ♀♀; Kali-Gandaki-Kola, Tatopani, 50 km SW of Pokhara; 1100–1400 m a.s.l.; 12–15 May 1984; C. Holzschuh leg.; PCMS.



**Fig. 12.** *Sphecodes lasimensis* Blüthgen, 1927, ♀ (PCMS). Habitus in lateral view. Scale bar = 1 mm.



**Descriptive notes**

Wings with brownish darkening; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins ca 70°, costal margin with eight, nine or ten hamuli.

**Female**

Total body length 7.5–10 mm (Fig. 12). Head transverse, ca 1.25 times as wide as long (Fig. 13A); vertex elevated with distance from top of head to upper margin of lateral ocellus approximately two lateral ocellar diameters as seen in frontal view; labrum trapezoidal, 0.7 times as long as basal width; ocello-ocular area and vertex irregularly punctate with punctures separated by 0.5–4 puncture diameters;



**Fig. 13.** *Sphecodes lasimensis* Blüthgen, 1927, ♀ (PCMS). **A.** Head in frontal view. **B.** Mesosoma in dorsal view. **C.** Metasoma in dorsal view. Scale bars = 1.0 mm.

paraocular area with dense adpressed white pubescence, but not obscuring integument, gena with sparser pubescence. Mesoscutum and mesoscutellum sparsely punctate (30–50  $\mu\text{m}$  / 1–7); propodeal triangle (metapostnotum) and mesepisternum reticulate-rugose (Fig. 13B). Metasomal terga sparsely punctate, on discs with shallow tiny punctures separated by a few diameters (Fig. 13C); T1 marginal zone indistinctly punctate with a few tiny punctures; T2–T4 marginal zone smooth and impunctate; pygidial plate 0.5 times as wide as metabasitarsus; T1–T4 red, T5 partially brownish.

**Male** (according to Blüthgen 1927)

Head weakly transverse, ca 1.15 times as wide as long; vertex elevated with distance from top of head to upper margin of lateral ocellus approximately two lateral ocellar diameters as seen in frontal view. Tyloids (from F4 onward) weakly developed, semicircular across basal  $1/5$ – $1/3$  of ventral surface of flagellomeres.

**Distribution**

Himalayas: India (Himachal Pradesh), \*Nepal.

*Sphecodes laticeps* Meyer, 1920

Fig. 5B

*Sphecodes laticeps* Meyer, 1920: 121, ♀, ♂.

*Sphecodes candidius* Meyer, 1925: 10, ♀. Synonymized by Blüthgen 1927: 85.

*Sphecodes biroi mariae* Cockerell, 1930: 162, ♂ (holotype: ♂, Thailand, “Siam, Nam, Jan. 8, 1928 (Cockerell)”; USNM, <http://n2t.net/ark:/65665/3e3daca86-a75f-458d-b994-6723b995dccc>). Synonymized by Astafurova *et al.* 2020b: 65.

**Diagnosis and descriptive notes**

See Astafurova *et al.* (2020b: 65–67).

**Material examined**

NEPAL • 1 ♂; Bagmati; 1600–2000 m a.s.l.; 26 Aug. 1975; Takagi-S. leg.; PCMS.

TAIWAN • 1 ♂, lectotype (designated by Astafurova *et al.* 2020b: 64); Formosa [Taiwan], Takao; ZMHB • ♀, holotype of *Sphecodes candidius* Meyer, 1925; “Lake Candidius 25./9/–10./10/ 1907”; HNHM.

**Distribution**

Himalayas: \*Nepal; China (Yunnan, Taiwan), Thailand, Vietnam.

*Sphecodes monilicornis* (Kirby, 1802)

Figs 3B, 5C

*Melitta monilicornis* Kirby, 1802: 47, ♂ (type locality: England).

*Sphecodes maculatus* Lepeletier de Saint Fargeau, 1841: 545, ♂ (type locality: France).

*Sphecodes subquadratus* Smith, 1845: 1014, ♀, ♂ (type locality: England).

*Sphecodes gibbus* var. *ephippium* subvar. *rufipes* Sichel, 1865: 428, ♀, ♂. Unavailable name (ICZN 1999, Article 45.5 of Code).

*Sphecodes gibbus* var. *ephippium* subvar. *dubius* Sichel, 1865: 419, ♂. Unavailable name (ICZN 1999, Article 45.5 of Code).

*Sphecodes gibbus* var. *ephippium* subvar. *incertus* Sichel, 1865: 420, ♂. Unavailable name (ICZN 1999, Article 45.5 of Code).

*Sphécodes gibbus* var. *ephippium* subvar. *nigrescens* Sichel, 1865: 427, ♂. Unavailable name (ICZN 1999, Article 45.5 of Code).

*Sphécodes gibbus* var. *ephippium* subvar. *testaceipes* Sichel, 1865: 428, ♂. Unavailable name (ICZN 1999, Article 45.5 of Code).

*Sphécodes ruficrus* Dalla Torre, 1896: 9 (nom. praeocc., nec Erichson, 1835), replacement name for *Sphécodes rufipes* Sichel, 1865.

*Sphécodes hanuman* Nurse, 1903: 538, ♀ (syntypes: ♀♀, India, Jammu and Kashmir, 5–6000 ft, 5.01; NHMUK; not examined). Synonymized by Blüthgen 1927: 39.

*Sphécodes caucasicus* Meyer, 1920: 124, ♂ (type locality: Georgia).

*Sphécodes cephalotes* Meyer, 1920: 129, ♀ (type locality: Turkey).

*Sphécodes smyrnensis* Meyer, 1920: 116, ♂ (type locality: Turkey).

*Sphécodes monilicornis quadratus* Meyer, 1920: 129, ♂, ♀ (type locality: Spain).

*Sphécodes monilicornis* var. *nigerrima* Blüthgen, 1927: 41, ♂ (syntypes: 3 ♂♂, Pakistan: Quetta; India: Sringar (Jammu and Kashmir); ?ZMHB; not examined). Synonymized by Warncke 1992: 22.

*Sphécodes quadratus cephalotiformis* Pittoni, 1950: 62, ♂, ♀ (type locality: Cyprus).

*Sphécodes monilicornis berberus* Warncke, 1992: 22, ♂, ♀ (type locality: Morocco).

*Sphécodes monilicornis* – Ascher & Pickering 2020: map.

### Diagnosis

See Astafurova *et al.* (2018a: 24).

### Material examined

NEPAL • 1 ♀; Godavari, Napal Valley; 26 Mar. 1968; T. Matsumura leg.; PCMS.

### Distribution

Himalayas: India (Jammu and Kashmir), \*Nepal; North Africa, Europe (north to 64°), Turkey, Caucasus, Jordan, Syria, Kazakhstan, Central Asia, Iran, Pakistan, Russia (east to Far East), Mongolia, China (Heilongjiang).

### *Sphécodes montanus* Smith, 1879

Figs 3C, 4A–B

*Sphécodes montanus* Smith, 1879: 27, ♀, ♂.

*Sphécodes montanus* – Gupta 2013: 60. — Ascher & Pickering 2020: map.

### Diagnosis and descriptive notes

See Astafurova *et al.* (2020b: 68–70).

### Material examined

#### Syntype

INDIA • 1 ♀; “Type // N.Ind // Masuri [Mussoorie, Uttarakhand, India] 7000 feet // Pres. by Imp. Inst. Ent. Brit. Mus. 1932-360 // *Sphécodes montanus* Smith, Type ♂ et ♀ // B.M.Type HYM.17a549”; NHMUK 013380316.

#### Other material

NEPAL • 1 ♀; Jumla Distr.; 12–14000 ft a.s.l.; May–Jun. 1961; J. Burmet leg.; NHMUK 013380477 • 1 ♀, 1 ♂; Godavari, Napal Valley; 26 Mar. 1968; T. Matsumura leg.; PCMS • 1 ♀; Gosainkund; 18 Feb. 1968; 8000 ft a.s.l.; T. Kawamichi leg.; PCMS • 2 ♀♀; Koshi Basantapur; 2300 m a.s.l.; 30 May–2



Jul. 1985; C. Holzschuh leg.; PCMS • 1 ♀; Rasuwa Distr., Langtang NP, Dhunche-Bharkhu-Syabru; 2000–2800 m a.s.l.; 6–13 May 1996; P. Cechovski leg.; PCMS • 1 ♀; Terhatum Distr., Tamur Valley, Basantpur; 2400 m a.s.l.; 29–30.V.1996; P. Cechovski leg.; PCMS • 1 ♀; NE Kathmandu, Nagar Kot; 1800–2000 m a.s.l.; 26 Jun. 1980; C. Holzschuh leg.; PCMS.

INDIA • 2 ♀♀; Uttarakhand, Uttarkashi; 30°73' N, 78°45' E; 1235 m a.s.l.; 1 May–25 Jun. 2012; K. Tomkovich leg.; ZMMU.

BHUTAN • 1 ♀; Timphu; 10 Mar. 1985; D.E. Padgham leg.; NHMUK 013380472.

### Distribution

Himalayas: India (Uttarakhand), \*Nepal, \*Bhutan; India (Rajasthan), Laos, China (Xizang, Sichuan, Yunnan).

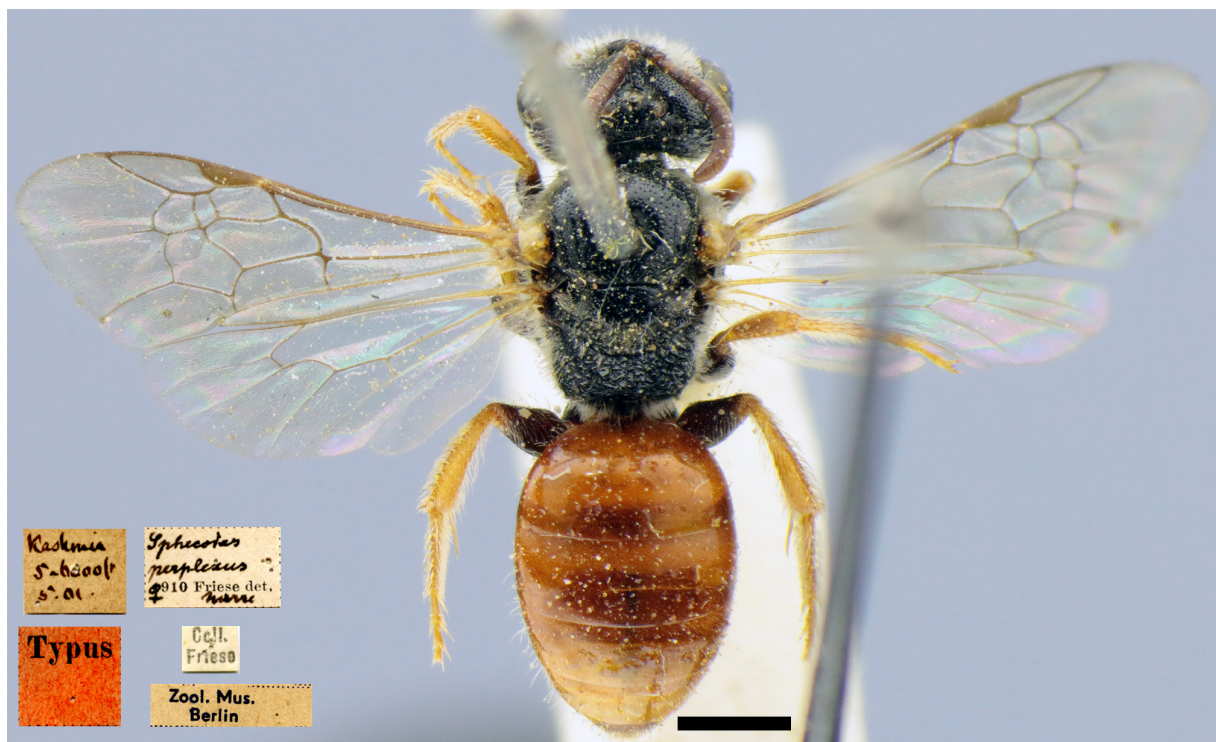
*Sphecodes perplexus* Nurse, 1903  
Figs 14, 15A–D

*Sphecodes perplexus* Nurse, 1903: 540, ♀.

*Sphecodes perplexus* – Saini & Rathor 2012: 163. — Ascher & Pickering 2020: map.

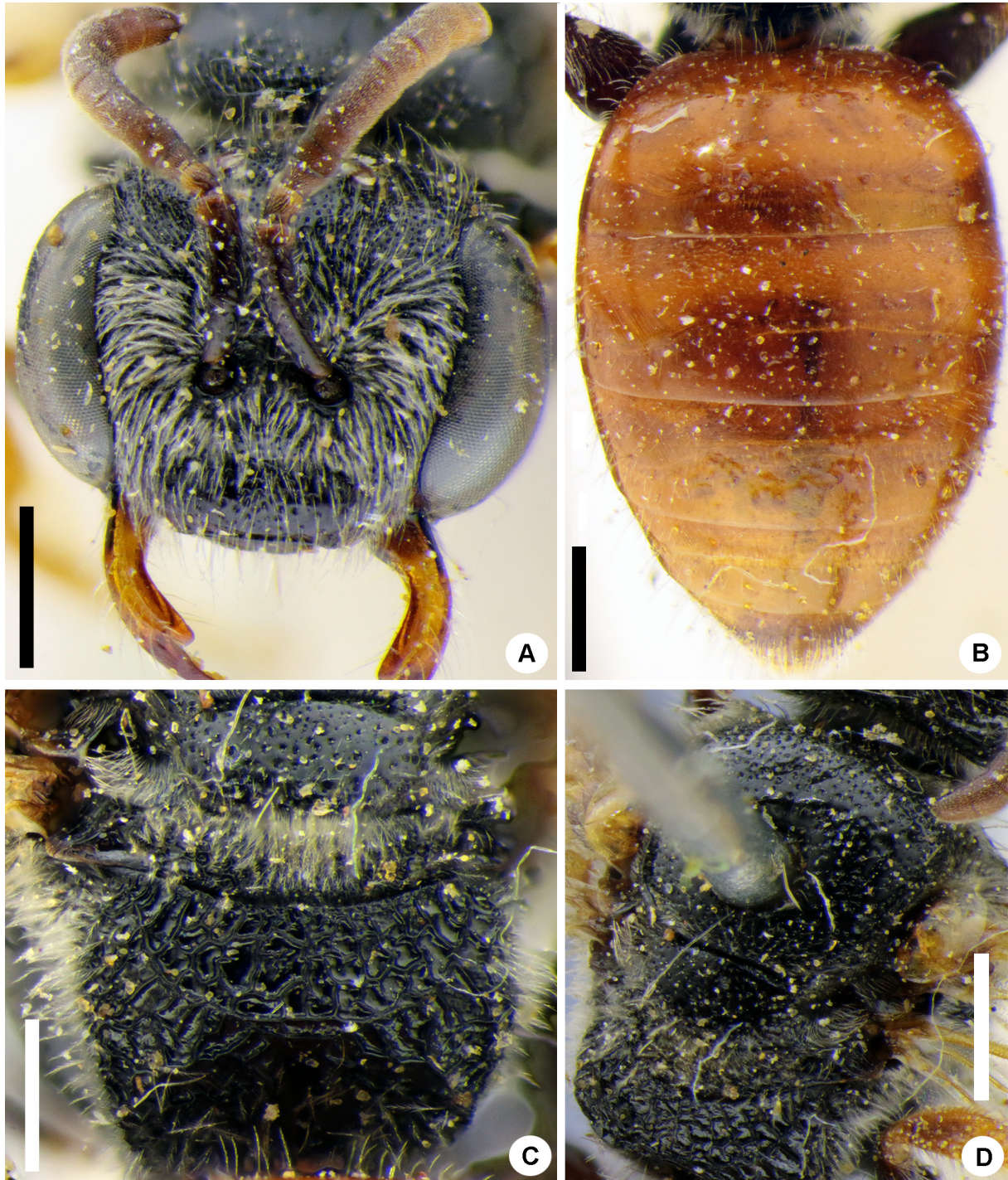
### Diagnosis

The female of this species is similar to that of *S. tantalus* Nurse, 1903 owing to a similar structure, sculpture and coloration of the body, but it differs from this species by having a more densely punctate



**Fig. 14.** *Sphecodes perplexus* Nurse, 1903. Syntype, ♀ (ZMHB). Habitus in dorsal view and labels. Scale bar = 1 mm.





**Fig. 15.** *Sphecodes perplexus* Nurse, 1903. Syntype, ♀ (ZMHB). **A.** Head in frontal view. **B.** Metasoma in dorsal view. **C.** Mesoscutum and propodeum in dorsal view. **D.** Mesosoma in dorsal view. Scale bars = 0.5 mm.

mesoscutum, with the punctures separated by 1–2 puncture diameters (vs 2–5), and the pygidial plate as wide as the metabasitarsus (vs 0.8). Both these species are close to *S. crassus* Thomson, 1870 by the strongly enlarged metafemur, but it differs by the entirely red metasoma.

### Material examined

#### Syntypes

INDIA • 1 ♀; “syntype: <red circle>”, “Kashmir 5–6000 ft. 5.01”, “Col. C. G. Nurse Collection, 1920–72”, “*Sphécodes perplexus* Nurse”, “B.M. TYPE HYM. 17.a.586”; NHMUK • 1 ♀; “Kashmir 5–6000 ft. 5.01”, “*Sphécodes perplexus* Friese det.”, “Coll. Friese”, “Typus”; ZMHB (label photo Fig. 14).

### Descriptive notes

Wings hyaline, without darkening; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins ca 80°, costal margin with five hamuli.

#### Female

Total body length 6.5 mm (Fig. 14). Head (Fig. 15A) strongly transverse, ca 1.3 times as wide as long; vertex weakly elevated as seen in frontal view (distance from top of head to upper margin of lateral ocellus at most a lateral ocellar diameter), but wide as seen in dorsal view (approximately three ocellar diameters); F1 and F2 strongly transverse, ca 0.6 times as long as wide, F3 weakly transverse, 0.8 times as long as wide; labrum semi-oval, 0.6 times as long as wide; clypeus and ocello-ocular area with dense punctures separated by 0.5–1 puncture diameter; paraocular and supraclypeal areas with dense plumose pubescence, but not obscuring integument. Mesoscutum (Fig. 15C–D) with sparse punctures (20–25 µm) separated by one or two puncture diameters; hypopimeral area reticulate; metafemur strongly enlarged in proximal half, maximum width 0.5 times its length; tibia and tarsi red-yellowish. Metasomal T1 impunctate (Fig. 15B), T2 on an anterior half with fine and relatively dense punctures; marginal zones impunctate; pygidial plate as wide as metabasitarsus; T1–T5 red.

#### Male

Unknown.

### Distribution

Himalayas: India (Jammu and Kashmir).

### *Sphécodes setiger* Blüthgen, 1924 Fig. 16A–D

*Sphécodes setiger* Blüthgen, 1924: 511–512, ♀.

*Sphécodes setiger* – Ascher & Pickering 2020: map.

### Diagnosis

This species is similar to small Palaearctic species with simple mandibles which lack the inner tooth (i.e., *Sphécodes decorus* (Cameron, 1897), *S. longuloides* Blüthgen, 1923, *S. hirtellus* Blüthgen, 1923, *S. longulus* Hagens, 1882, *S. puncticeps* Thomson, 1870, *S. turanicus* Astafurova & Proshchalykin, 2017 and *S. trjapitzini* Astafurova & Proshchalykin, 2018). Among these species *S. setiger* is closest to *S. puncticeps*, but differs from this species by having square (as long as wide) F1 and F2 (vs 0.6–0.7 times as long as wide).



**Material examined**

**Holotype**

INDIA • ♀; “Type // Simla [India], Nurse 9. 98 // Col. C.G. Nurse Collection. 1920-72 // *Sph. setiger*, ♀, Type P. Blüthgen det. // B.M.Type HYM.17a562”; NHMUK 013380328.

**Descriptive notes**

Wings hyaline, without darkening; hind wing with basal vein strongly curved with the angle between basal (*M*) and cubital (*Cu*) veins almost 90°, costal margin with five hamuli.

**Female**

Total body length 5.5 mm. Head strongly transverse, 1.25 times as wide as long (Fig. 16A); vertex not elevated; F1–F3 square, as long as wide (Fig. 16B); clypeus with punctures separated by at most



**Fig. 16.** *Sphcodes setiger* Blüthgen, 1924. Holotype, ♀ (NHMUK 013380328). **A.** Head in frontal view. **B.** Antenna in lateral view. **C.** Metasoma in dorsal view. **D.** Labels. Scale bars = 1 mm.

a puncture diameter; ocello-ocular area with dense punctures separated by at most a half puncture diameter; paraocular and supraclypeal areas with relatively dense plumose pubescence, but not obscuring integument. Mesoscutum with punctures (15–30  $\mu\text{m}$ ) separated by at most a puncture diameter; hypoepimeral area coarsely reticulate; legs red-brownish. Metasomal T1 impunctate, except a few punctures (5  $\mu\text{m}$ ) along marginal zone; anterior half of T2–T4 discs distinctly punctate (10–15  $\mu\text{m}$  / 2–5), sparser on posterior half; T1–T3 red (Fig. 16C); pygidial plate as wide as metabasitarsus.

#### Male

Unknown.

#### Distribution

Himalayas: India (Himachal Pradesh).

#### Remarks

Since we could not clearly differentiate between females of *S. setiger* and *S. puncticeps*, except by relative flagellar length, more specimens from the type locality including the male are needed to be studied to make a decision on their synonymy.

### *Sphecodes shillongensis* Blüthgen, 1927

Fig. 17A–D

*Sphecodes shillongensis* Blüthgen, 1927: 95, fig. 29a–b.

*Sphecodes shillongensis* – Saini & Rathor 2012: 163. — Ascher & Pickering 2020: map.

#### Diagnosis

This species is similar to *S. chaprensis* and *S. simlaensis*, sharing similar shape and sculpture of the body, including weakly developed antennal tyloids, a densely punctate mesoscutum and scarcely punctate metasomal terga, but differs from these species by having longer antennae with flagellomeres (from F3 onward) ca 1.3 times as long as wide (vs 1.1–1.2) and the shape of the gonostylus without a membranous part.

#### Material examined

##### Holotype

INDIA • ♂; “Type // Shillong, 4.03 // Assam, R. Turner. 1905-125. // *Sphecodes shillongensis* n.sp., ♂, P. Blüthgen det. // B.M.Type HYM.17a.563”; NHMUK 013380326.

#### Descriptive notes

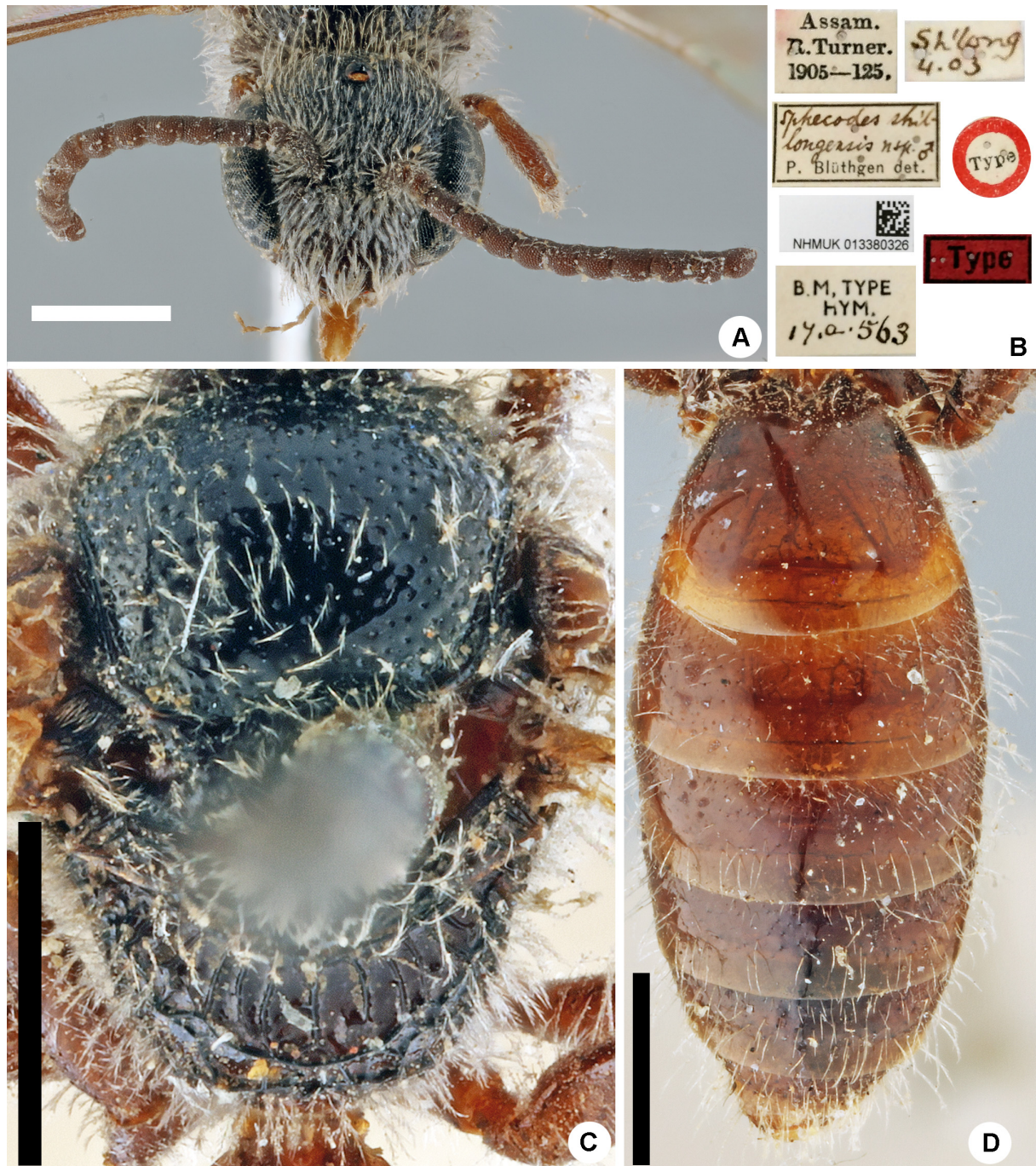
Wings hyaline; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins almost 90°, costal margin with five hamuli. Preoccipital carina absent.

#### Male

Total body length 5.0 mm. Head transverse, ca 1.15 times as wide as long (Fig. 17A); vertex not elevated as seen in frontal view; antennae attaining posterior margin of mesoscutellum, F1 0.75 times as long as wide, remaining flagellomeres ca 1.3 times as long as wide; tyloids weakly developed, covering at most basal  $\frac{1}{5}$ – $\frac{1}{4}$  of ventral surface of last flagellomeres (Fig. 17A); ocello-ocular area with dense punctures (10–15  $\mu\text{m}$ ) separated by at most a half puncture diameter; face with dense plumose white pubescence, obscuring integument below antennal sockets. Gena with sparser pubescence. Mesoscutum and mesoscutellum finely punctate, sparser medially (15–20  $\mu\text{m}$  / 0.5–3), becoming denser peripherally;



mesepisternum and hypoepimeral area rugose; propodeal triangle (metapostnotum) shining, with coarse longitudinal wrinkles; remaining surfaces of propodeum reticulate-rugose (Fig. 17C); legs red. Metasoma red; terga scarcely punctate (Fig. 17D); T1 almost impunctate, with a few microscopic punctures (3–5 µm); remaining terga basally with tiny setal pores; marginal zones impunctate; gonocoxite dorsally with impression; gonostylus small, without a membranous part.



**Fig. 17.** *Sphecodes shillongensis* Blüthgen, 1927. Holotype, ♂ (NHMUK 013380326). **A.** Head in frontal view. **B.** Labels. **C.** Mesosoma in dorsal view. **D.** Metasoma in dorsal view. Scale bars = 0.5 mm.

**Female**

Unknown.

**Distribution**

Himalayas: India (Meghalaya).

***Sphecodes sikkimensis* Blüthgen, 1927**

Fig. 18A–E

*Sphecodes sikkimensis* Blüthgen, 1927: 54, fig. 12a, ♀.

*Sphecodes sikkimensis* – Ascher & Pickering 2020: map.

**Diagnosis and descriptive notes**

See Astafurova *et al.* (2020b: 78) and refer to the diagnosis of *Sphecodes uttaricus* sp. nov. below.

**Material examined**

**Lectotype** (designated here)

INDIA • 1 ♀; “Sikkim [India], 6.97., Rungit Tal, 1000', Coll. Bingham // *Sphec. fumipennis* Dr. Meyer det. // *Sphec. sikkimensis* n.sp. P. Blüthgen det.”; ZMHB.

**Paralectotypes**

INDIA • 2 ♀♀; same collection data as for lectotype (same labels); ZMBH.

**Distribution**

Himalayas: India (Sikkim); Myanmar, Laos, China (Sichuan, Yunnan, Fujian, Guandong).

***Sphecodes simlaensis* Blüthgen, 1924**

Fig. 3G

*Sphecodes simlaensis* Blüthgen, 1924: 514–515, ♀ (syntypes: 2 ♀♀, India, Simla, Nurse leg., VIII. and IX. 98; were not found in NHMUK).

*Sphecodes simlaellus* Blüthgen, 1927: 46–48, fig. 8, ♂. Synonymized by Astafurova *et al.* 2020b: 79.

*Sphecodes simlaensis* – Ascher & Pickering 2020: map.

**Diagnosis and descriptive notes**

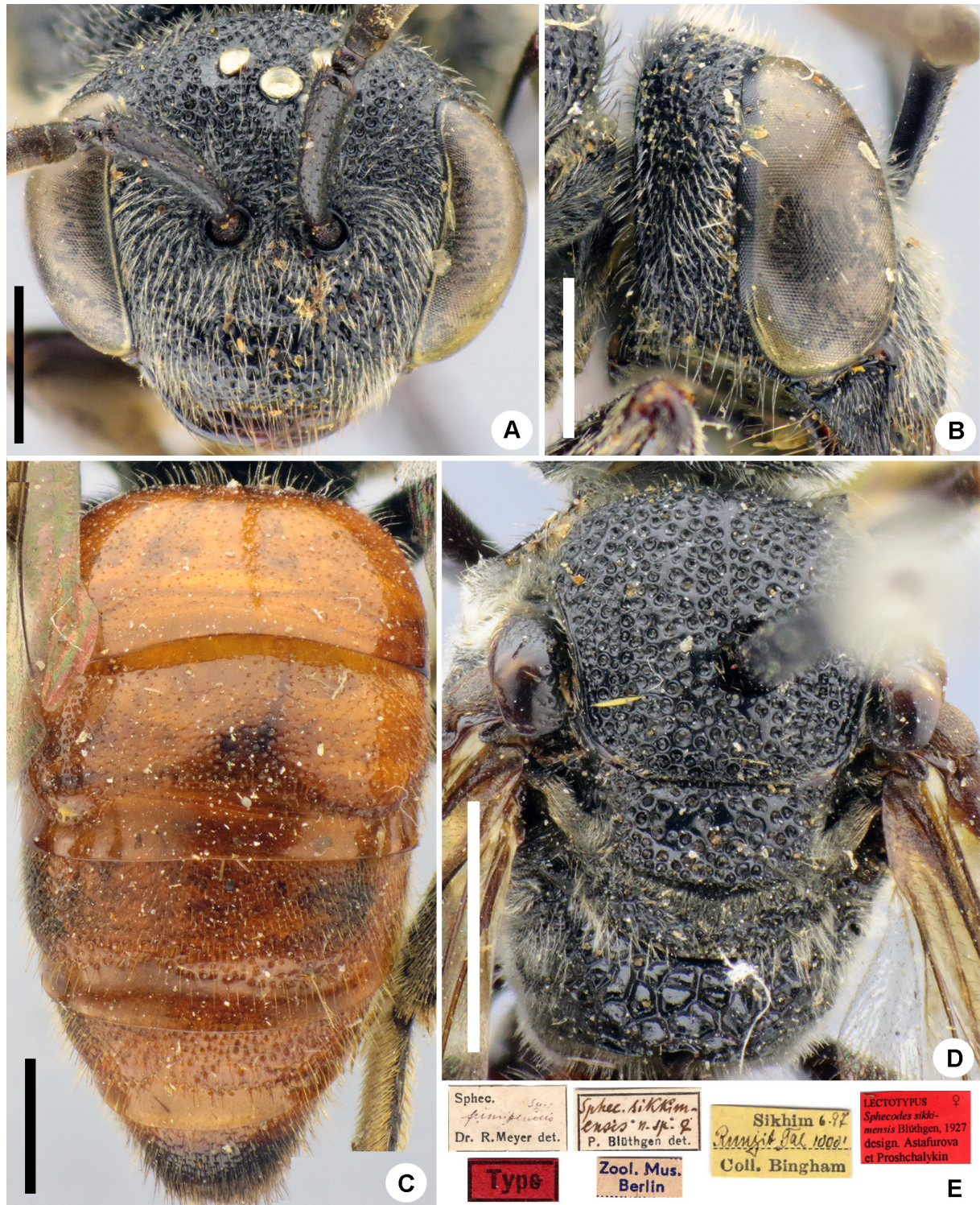
See Astafurova *et al.* (2020b: 79–81).

**Material examined**

INDIA • 2 ♂♂, lectotype and paralectotype of *S. simlaellus*, designated by Astafurova *et al.* (2020b: 79); “Simla [India, Himachal Pradesh], 8.[18]98, Col. C.G. Nurse Collection. 1920-72”; NHMUK • 6 ♀♀; Kashmir [Jammu and Kashmir]; Jul. 1901; Nurse leg.; ZMHB • 6 ♀♀; Uttarakhand, Uttarkashi; 30°73' N, 78°45' E; 1235 m a.s.l.; 1–2 May 2012; K. Tomkovich leg.; ZMMU.

NEPAL • 1 ♂; Gulbu Bhanjang; 9 Jun. 1968; T. Matsumura leg.; PCMS • 1 ♂; Namche Bazar; 8 Jul. 1968; T. Matsumura leg.; PCMS • 1 ♀; Nangitanti; 1 May 1968; T. Matsumura leg.; PCMS • 1 ♀; Everest Reg., Jambesi; 27°34' N, 86°32' E; 19 Mar. 2010; A. Reschikov leg.; ZISP • 2 ♀♀; Bagam, Sindhupal Chok, Sarmatang; 27°57' N, 85°56' E; 2500 m a.s.l.; C. Holzschuh leg.; PCMS • 2 ♀♀; Rasuwa Distr.,





**Fig. 18.** *Sphecodes sikkimensis* Blüthgen, 1927. Lectotype, ♀ (ZMBH). A–B. Head in frontal (A) and lateral view (B). C. Metasoma in dorsal view. D. Propodeum in dorso-lateral view. E. Labels. Scale bars: A–C = 1 mm; D = 0.5 mm.



Langtang NP, Dhunche-Bharkhu-Syabru; 2000–2800 m a.s.l.; 6–13 May 1996; P. Cechovski leg.; PCMS • 1 ♀; Koshi Gorza; 2100 m a.s.l.; 5 Jun. 1985; C. Holzschuh leg.; PCMS.

BHUTAN • 3 ♀♀; Paro Prov., Chiley-La; 3000–3500 m a.s.l.; C. Holzschuh leg.; PCMS • 1 ♂; Thimphu Distr., Taba; 2600 m a.s.l.; C. Holzschuh leg.; PCMS.

### Distribution

Himalayas: India (Jammu and Kashmir, Himachal Pradesh, \*Uttarakhand), \*Nepal, \*Bhutan; Laos, China (Sichuan, Yunnan).

### *Sphecodes tantalus* Nurse, 1903

Figs 19, 20A–D

*Sphecodes tantalus* Nurse, 1903: 539, ♀.

*Sphecodes tantalus* – Dar *et al.* 2018: 531. — Dar & Wani 2018: 1432.

### Diagnosis

The female of this species is similar to that of *S. perplexus* (refer to Diagnosis of *S. perplexus* above).

### Material examined

#### Syntypes

INDIA • 1 ♀; “(syntype), <red circle>”, “Kashmir [Jammu and Kashmir] 5–6000 ft. 5.01”, “Col. C. G. Nurse Collection, 1920-72”, “*Sphecodes tantanus* Nurse”, “♀, Type”, “B.M. TYPE HYM. 17.a.585”; NHMUK 013380356 • 1 ♀; “Kashmir 5–6000 ft. 5.01”; ZMHB.

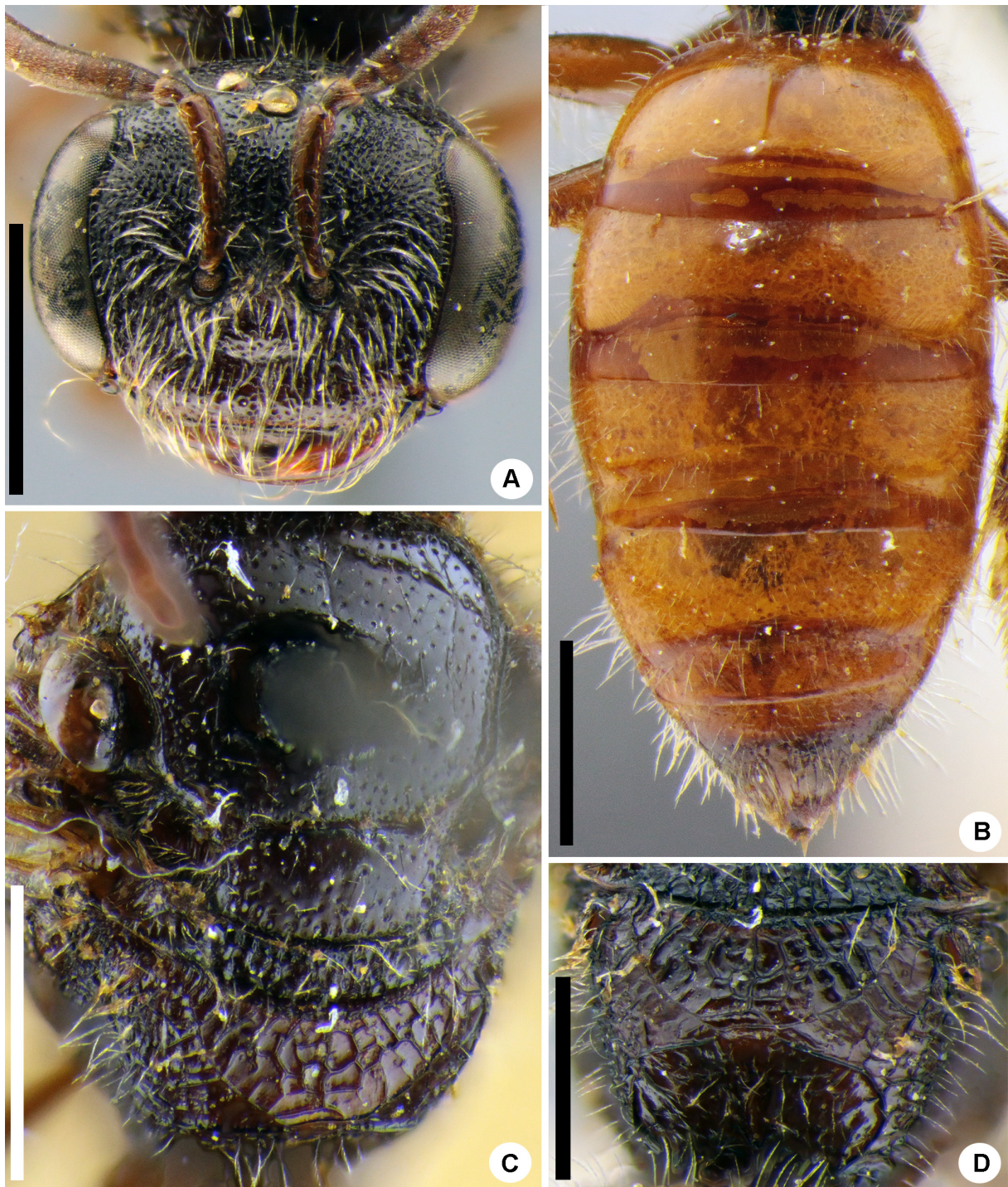
### Descriptive notes

Wings hyaline, without brownish darkening; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins ca 80°, costal margin with six hamuli.



**Fig. 19.** *Sphecodes tantalus* Nurse, 1903. Syntype, ♀ (ZMHB). Habitus in lateral view. Scale bar = 1 mm.





**Fig. 20.** *Sphecodes tantalus* Nurse, 1903. Syntype, ♀ (ZMHB). **A.** Head in frontal view. **B.** Metasoma in dorsal view. **C.** Mesoscutum and propodeum in dorsal view. **D.** Propodeum in dorsal view. Scale bars: A–C = 1 mm; D = 0.5 mm.



### Female

Total body length 8 mm (Fig. 19). Head strongly transverse, ca 1.3 times as wide as long (Fig. 20A); vertex weakly elevated as seen in frontal view (distance from top of head to upper margin of lateral ocellus at most a lateral ocellar diameter), but wide as seen in dorsal view (approximately three ocellar diameters); F1 and F2 strongly transverse, 0.6–0.7 times as long as wide, F3 almost square; labrum semi-oval, 0.6 times as long as wide; clypeus and ocello-ocular area with dense punctures separated by at most a half puncture diameter; paracocular and supraclypeal areas with relatively dense, but thin plumose pubescence, not obscuring integument. Mesoscutum with sparse punctures (20–25  $\mu\text{m}$ ) separated by 2–5 puncture diameters (Fig. 20C); hypoepimeral area reticulate; metafemur strongly enlarged in proximal half, maximum width 0.4 times its length; legs red. Metasomal T1 impunctate, T2–T4 with a few fine setal pores, marginal zones impunctate; pygidial plate dull, 0.8 times as wide as metabasitarsus; T1–T5 red (Fig. 20B).

### Male

Unknown.

### Distribution

Himalayas: India (Jammu and Kashmir); India (Rajasthan according to Ascher & Pickering 2020: map).

### Description of a new species from India

#### *Sphecodes uttaricus* sp. nov.

urn:lsid:zoobank.org:act:A059C88D-0961-420A-9C97-FC19D1D2248D

Figs 21, 22A–E

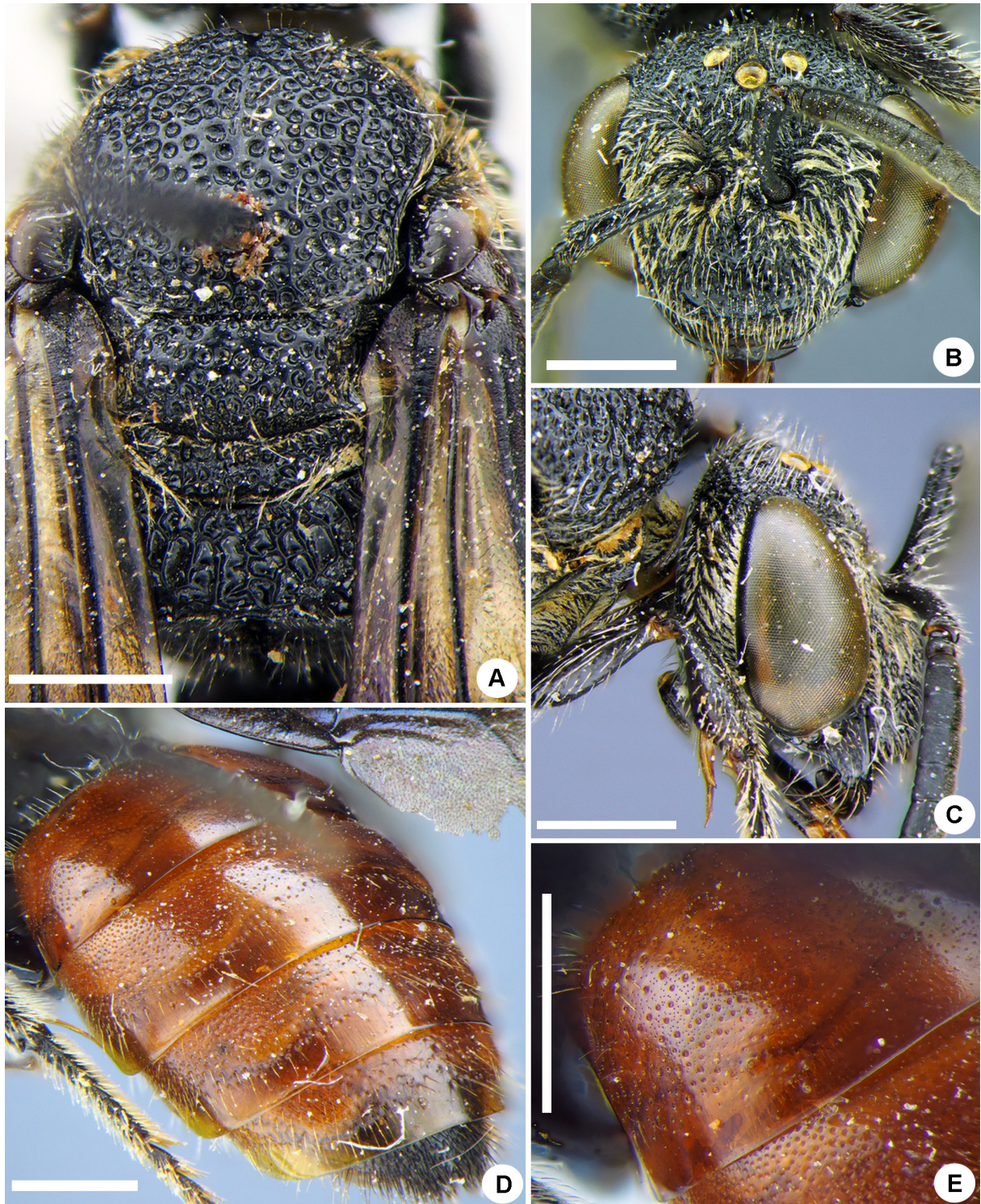
### Diagnosis

This species is closest to *S. sikkimensis* and *S. formosanus* Cockerell, 1911 by a combination of large body size (more than 9 mm), costal margin with at least nine hamuli and the presence of a lateral



**Fig. 21.** *Sphecodes uttaricus* sp. nov. Holotype, ♀ (PCMS/OLBL). Habitus in lateral view and labels. Scale bar = 1 mm.





**Fig. 22.** *Sphecodes uttaricus* sp. nov. Holotype, ♀ (PCMS/OLBL). **A.** Mesosoma, dorsal view. **B–C.** Head in frontal (B) and lateral view (C). **D.** Metasoma in dorso-lateral view. **E.** T1 in dorso-lateral view. Scale bars = 1 mm.



preoccipital carina. The new species differs from *S. sikkimensis* by having fewer hamuli (9–10 vs 12–15) and a smaller body size (10.5 mm vs 12–15 mm) and from *S. formosanus* it differs by having sparse and mixed punctation of T1 with coarse (15–25  $\mu\text{m}$  / 0.5–3) and microscopical punctures (5  $\mu\text{m}$ ) (vs dense and coarse punctures separated by 0.5–1 puncture diameter).

### Etymology

The specific epithet is named after the Indian state Uttar Pradesh, the type locality of this species.

### Type material

#### Holotype

INDIA • ♀; Uttar Pradesh bor., Karnaprayag env.; [30°27' N, 79°25' E]; 770 m a.s.l.; 19–21 Jul. 1994; M. Valenta leg.; PCMS/OLBL.

### Description

#### Female (holotype, Fig. 21)

MEASUREMENTS. Total body length 10.5 mm.

HEAD (Fig. 22B–C). Black; transverse, ca 1.25 times as wide as long; lateral preoccipital carina present, well-developed; vertex elevated, distance from top of head to upper margin of lateral ocellus ca 1.5 ocellar diameter as seen in frontal view and ca two diameters as seen in dorsal view; mandibles bi-dentate; F1 0.5 times as long as wide; F2 0.7 times as long as wide; F3 1.1 times as long as wide; supraclypeal area bulging; frons and paraocular area mostly with confluent punctures; ocello-ocular area densely punctate with confluent punctures and punctures separated by at most a half puncture diameter (30–50  $\mu\text{m}$ ); clypeus sparser punctate with shiny, smooth interspaces equal to at most a puncture diameter; paraocular area and gena with dense plumose setae, obscuring integument.

MESOSOMA. Mesosoma (including legs) black; wings with strong brownish darkening and metallic violet luster; stigma and veins dark brown; hind wing with the angle between basal (*M*) and cubital (*Cu*) veins ca 70°, costal margin with nine hamuli; mesoscutum and mesoscutellum (Fig. 22A) densely and coarsely punctate (50–100  $\mu\text{m}$ ), with confluent punctures peripherally and medially with punctures separated by at most a puncture diameter; hypoepimeral area and mesepisternum coarsely reticulate-rugose; propodeal triangle (metapostnotum) roughly reticulate-rugose (sculpture forming 2–3 rows of large deep cells).

METASOMA. Metasomal T1 on disc with coarse punctures (15–25  $\mu\text{m}$ ) separated by 0.5–3 puncture diameters and laterally with numerous tiny punctures (ca 5  $\mu\text{m}$ ) between them, marginal zone sparsely and finely punctate, impunctate along posterior margin (Fig. 22E); remainder of terga similarly punctate, but denser and with impunctate marginal zones (Fig. 22D); pygidial plate dull, as wide as metabasitarsus; T1–T4 red; sterna finely tessellate to smooth with coarse shallow setal pores.

#### Male

Unknown.

### Distribution

Only known from the holotype.

### Discussion

In total, 26 species of *Sphecodes* are now recorded from the Himalayas (Table 1), and 16 of these are distributed beyond the studied region. The Himalayan mountain system is traditionally considered to

be the boundary between the Palaearctic and the Oriental regions. This feature is reflected in the mixed composition of the fauna of the genus in this region: the *Sphecodes* fauna of the Himalayas includes eight Palaearctic, eight Oriental and ten endemic species.

The Himalayan fauna of *Sphecodes* has a high degree of endemism (38%), but this phenomenon may be in part due to an incomplete knowledge of the distribution of the *Sphecodes* fauna. Illustrating this, one half of these endemic species (*S. almoransis*, *S. dissimilandus*, *S. setiger*, *S. shillongensis*, *S. perplexus*) are known only from their type localities.

The majority of the Palaearctic Himalayan *Sphecodes* assemblage is composed of widespread Trans-Palaearctic or Eurasian species. Only the range of *S. hakkariensis* is otherwise small, limited to mountainous areas of Turkey and Tajikistan. Interestingly, *Sphecodes cameronii* is an inter-realm species, distributed from Turkey and Central Asia to India (Pali) and Sri Lanka. All Palaearctic Himalayan species occur in the western to central parts of the Himalayas; moreover, three of them (*S. alternatus*, *S. intermedius*, *S. hakkariensis*) in the studied territory are known from Tajikistan (Gorno-Badakhshan Province) only.

The Oriental Himalayan species of *Sphecodes* are distributed from the Himalayas to Southeast Asia and China, where they are mainly distributed in mountainous areas. In the Himalayas, these species occur in the central and eastern parts. The ranges of *Sphecodes kershawi* and *S. binghami*, which are distributed all the way to Malaysia, are the most widespread among Oriental species occurring in the Himalayas.

## Acknowledgements

We are grateful to Fritz Gusenleitner (OLBL) for help during our visit to Austria, Michael Orr (Beijing, China) for checking the English grammar, and David Notton (NHMUK) for assisting during work in the NHMUK Collection and providing photos of type specimens. We thank Maximilian Schwarz (Ansfelden, Austria), Esther Ockermueller (OLBL), James Hogan (OUMNH), Michael Ohl and Viola Richter (ZMHB) for providing *Sphecodes* specimens. We also thank Gavin Broad and one anonymous reviewer for their comments and suggestions to streamline and improve the manuscript. This investigation was supported by the Russian Funds for Basic Research (grant numbers 19-04-00027 and 20-54-44014) and the state research project AAAA-A19-119020690101-6.

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*Manuscript received: 3 July 2020*

*Manuscript accepted: 9 November 2020*

*Published on: 28 December 2020*

*Topic editor: Gavin Broad*

*Topic editor: Nesrine Akkari*

*Desk editor: Pepe Fernández*

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