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***Perissomyrmex nepalensis* sp.nov. – new evidence of Old World origins
for the genus (Hymenoptera, Formicidae)**

by **Alexander Radchenko**

Abstract. A new ant species from Nepal and India, *Perissomyrmex nepalensis* sp.nov., is described and a key to the identification of the species of this genus is provided. This is the third known species of the genus *Perissomyrmex* Smith, 1947. The discovery of another member of this genus in the Himalayan region supports the suggestion that the genus *Perissomyrmex* has its origins in the Old World.

Key words. Hymenoptera – Formicidae – ants – new species – Nepal

Introduction

The genus *Perissomyrmex* Smith, 1947 originally contained only the single species *P. snyderi*, which was described by SMITH (1947) after two workers were collected at the Hoboken plant quarantine station (New Jersey, USA). The specimens were found in the tuberous root of a *Begonia* plant that originated from Guatemala. This myrmicine genus possessed such peculiar features that M. R. Smith only provisionally attributed it to the tribe Myrmecini. *Perissomyrmex* has the following combination of unusual features: 9-jointed antennae with 3-segmented club; coarse costulate sculpture, especially on the upper surface of the head; presence of distinct medial processes on the anterior clypeal margin; poorly developed frontal lobes and exposed antennal articulations; elongate, relatively long (not widened) mandibles with 3 teeth on the masticatory margin and a fourth one on the inner margin, separated from the other teeth by a long diastema.

More recently, de Andrade (in BARONI URBANI & DE ANDRADE 1993) described a second species of this genus, *P. monticola* de Andrade, 1993, based on two workers and a dealated queen from Bhutan. In the same paper they supported BOLTON's (1981) placement of the genus in the tribe Myrmecini and provided morphological and zoogeographical evidence of its relationship with *Pristomyrmex* Mayr, 1866. They suggested that the genus *Perissomyrmex* has Old World origins and proposed that *P. snyderi* had been introduced into Guatemala. However, in the following year, *P. snyderi* was found in cloud forest, a native habitat of Mexico (LONGINO & HARTLEY 1994). They gave a first description of the queen, showed that *P. snyderi* is a polymorphic species and postulated that *Perissomyrmex* has a disjunctive distribution. They also predicted that additional populations (or species) of this genus would be found in isolated and specialised habitats.

The new species from Nepal and India, described here, supports this prediction, as does the discovery of another probably new, but as yet undescribed, species of *Perissomyrmex* from Southern China (OGATA & OKIDO 2002; ZHOU, pers. comm.). These new data also support the idea of an Old World origin for the genus.

Material

The description of the new species is based on material collected by the 2001 expedition by the Natural History Museum, Basel (NHMB) to Nepal, kindly sent me for identification by Dr. Daniel Burckhardt, and on specimens from the British Museum of Natural History, London (BMNH). The holotype and the paratype from Nepal are in the collection of the NHMB, and paratypes from India are in the BMNH. The holotype of *P. snyderi* (from the Smithsonian National Museum of Natural History, Washington) and 10 workers from Mexico (BMNH), and paratype worker of *P. monticola* (NHMB) were also studied.

Methods

The measurements (accurate to 0.01 mm) and indices used in this paper are, with some additions and alternations, based on those used by BARONI URBANI & DE ANDRADE (1993) and in our studies of genus *Myrmica* Latreille, 1804 (see RADCHENKO & ELMES 2001, etc.).

Measurements. HL1 – length of head in dorsal view, measured in a straight line from the anterior point of median clypeal margin (N.B. excluding central clypeal lobes) to mid-point of the occipital margin; HL2 – same, but measured from distal points of central clypeal lobes; HW1 – width of head in dorsal view in a line behind the eyes; HW2 – maximum width of head in dorsal view on its anterior part (near insertions of the mandibles); SL – maximum straight-line length of antennal scape seen in profile; OL – maximum diameter of the eye; AL – diagonal length of alitrunk seen in profile from the neck shield to the posterior margin of propodeal lobes; PL – maximum length of petiole from above; PPL – same of postpetiole; PH – maximum height of petiole in profile; PPH – same of postpetiole; PW – maximum width of petiole from above; PPW – same of postpetiole; ESL – maximum length of propodeal spine in profile; ESD – distance between tips of propodeal spine from above; HTL – maximum length of tibia of hind leg; PNW – maximum width of pronotum from above.

Indices. CI1 = HL1 / HW1; CI2 = HL2 / HW1; CWI = HW2 / HW1; SI = SL / HW1; OI = OL / HW1; PI1 = PW / PL, PI2 = PL / PH, PPI1 = PPW / PPL, PPI2 = PPL / PPH, ESLI = ESL / HW1; ESDI = ESD / ESL.

Description

Perissomyrmex nepalensis sp.nov.

Material examined. Holotype worker: Nepal, Kosi, Chanki, 27°11'–12'N, 87°27'–28'E Alt. 2600–3000 m, No. 221c, 22–24.vi.2001 (NHMB expedition in Nepal, 2001). Paratypes: 1 worker, same site, date and collectors (NHMB); 3 workers: India, W. Bengal, Darjeeling, Tiger Hill, 2450 m, 28.viii.1997 (G. Cuccodoro) (BMNH).

Workers (Figs 1–10). Head clearly wider than long, distinctly broadened anteriorly (in holotype worker; but in paratype workers it is much less broadened; compare Figs 1 and 9, and CWI in Table 1), with rounded occipital corners and more or less straight, at most

very shallowly concave, occipital margin. Anterior clypeal margin prominent medially, with a pair of relatively long medial lobes, and two much smaller lateral denticles. Mandibles elongate, with unwidened masticatory margin and with four teeth: three on masticatory margin and one on inner margin, separated from the others by long diastema. Frontal lobes not developed, antennal articulations exposed. Eyes small, more or less rounded, situated approximately at the mid-point of the sides of head. Ocelli absent. Antennal scape very feebly curved at the base, quite long, reaches distinctly beyond occipital corners. Frontal carinae short, feebly curved, merging into the costulae, which reach occipital margin (this feature is not particularly clear; in the holotype worker the right carina curves outwards to merge into the costula, which surrounds the antennal socket). Antennal sockets surrounded by concentric costulae.

Head dorsum with quite coarse, longitudinal, slightly sinuous costulae, which are distinctly divergent towards occipital corners; frons between frontal carinae level with the eyes, having 10–11 costulae. Frontal triangular and clypeus smooth. Mandibles with fine longitudinal costulae and rugosity, relatively coarser on basal half of the mandibles. Whole surface of the head between costulae with a very fine, superficial microsculpture (visible under magnification not less than $\times 100$) appears shiny. The palp formula is most probably 5,3 (previous authors gave no palp formula for *Perissomyrmex* species; unfortunately the labial and maxillary palps in all the specimens investigated are not clearly visible without dissection and making slides).

Alitrunk with convex promesonotal dorsum, which is distinctly raised over propodeal level. Promesonotal suture well developed, especially on the sides of alitrunk, but also distinctly visible from above. Posterio-lateral corners of pronotal dorsum forming rounded protuberance-like processes (viewed from above). Metanotal groove deep. Propodeal spines quite long, sharp, directed backwards and slightly upwards at an angle of about 45° , less or more divergent (viewed from above; compare Figs 5 and 10, and ESDI in Table 1). Propodeal lobes narrowly rounded. Petiole with long peduncle and strongly concave anterior surface, its node quite high, with rounded dorsum, without horizontal plate. Postpetiole quite high, with narrow, more or less cuneiform node, of which anterior surface slightly convex and posterior surface slightly concave (viewed in profile). Middle and hind tibiae without spurs.

Propleurae with coarse, regular, more or less straight, longitudinal costulae, which are broken or completely absent on antero-dorsal surface of pronotum. Lower part of mesopleurae smooth; both upper part of mesopleurae and sides of propodeum with short, somewhat sinuous, irregular longitudinal costulae. Distal part of pronotal dorsum, mesonotal- and propodeal dorsum with similar irregular costulae; central part of propodeal dorsum and its declivity between spines smooth. Whole surface between costulae smooth and shiny (similar to that of the head). Petiole and postpetiole almost completely smooth and shiny, only distal part of postpetiole with short irregular rugae. Gaster smooth and shiny.

Head with very abundant and long, thin standing hairs, curved at the tips; anterior clypeal margin with very long setae. Alitrunk also with abundant hairs, which are even longer than hairs on the head. Antennal scape with hairs of different length, but longest ones approximately 1.6 times longer than maximum width of scape. Femora and tibiae

with similar hairs, longest hairs on the hind tibiae 1.4–1.5 times longer than maximum width of tibia. Tarsi with long hairs on their outer margin (longest hairs 3.5–3.6 times longer than maximum width of the tarsus), and with much shorter, “brush-like”, dense subdecumbent hairs on their inner margin. Waist and gaster with numerous, long, slightly curved hairs. Whole surface of the body without decumbent pilosity.

Head, alitrunk and waist dark brownish-black to black, gaster dark brown, appendages distinctly lighter, brownish-yellow, clypeus and mandibles reddish-brown.

Queens and males as yet unknown.

Measurements (in mm; data for holotype are in brackets): HL1 = 0.82–1.07 (1.00), HL2 = 0.91–1.14 (1.06), HW1 = 0.89–1.17 (1.08), HW2 = 0.93–1.19 (1.14), SL = 0.83–1.00 (0.99), OL = 0.10–0.12 (0.10), AL = 1.04–1.25 (1.20), PL = 0.43–0.47 (0.46), PPL = 0.24–0.29 (0.28), PH = 0.29–0.34 (0.33), PPH = 0.29–0.34 (0.32), PW = 0.17–0.19 (0.18), PPW = 0.22–0.26 (0.24), ESL = 0.17–0.29 (0.29), ESD = 0.30–0.40 (0.33), HTL = 0.74–0.95 (0.91), PNW = 0.56–0.68 (0.63).

Indices see in Table 1.

Ecology is unknown. All specimens were collected from pitfall traps at an altitude of between 2450 and 3000 m.

Name derivation. Species named after Nepal, the country in which the holotype was found.

Comparative analysis

Although *P. monticola* shares many features with both previously described species, it clearly differs from them by a complex of morphological characters.

It is similar to *P. snyderi* in the long, outstanding hairs on the body and appendages, which in *P. snyderi* are less abundant on the head margins, but even longer on antennal scape and legs (in *P. nepalensis* sp.nov. longest hairs approximately 1.6 times longer than maximum width of the scape *versus* about 1.7 times in *P. snyderi*; respectively, on the hind tibiae longest hairs 1.4–1.5 times longer than maximum width of the tibia *versus* 1.7 times, and on the hind tarsi longest hairs 3.5–3.6 times longer than maximum width of the tarsus *versus* 4–4.5 times) (compare also Figs 1, 4–8 and 11, 13–17). In contrast, *P. monticola* has much less abundant outstanding hairs on the head, and much shorter ones on appendages: antennal scape with abundant, but very thin, fine hairs, which are not longer than maximum diameter of the scape; longest hairs on hind tibiae subequal or at most slightly longer than maximum width of the tibia, and on the hind tarsi longest hairs not more than 3 times longer than maximum width of the tarsus (compare also Figs 1, 4–8 and 18, 20–24).

In body colour, *P. nepalensis* sp.nov. is similar to *P. snyderi*, but has brownish-yellow appendages (much lighter than body) compared with the much darker brown of the latter species. On the other hand, the body colour of *P. monticola* is somewhat lighter than that of both other species and the appendages are even lighter (quite bright yellow) than in *P. nepalensis* sp.nov.

The shape and length of the central pair of clypeal lobes in *P. nepalensis* sp.nov. is similar to that in *P. monticola*, but in *P. snyderi* they are much shorter (compare Figs 1, 2, 18, 19 and 11, 12).

The sculpture of the head dorsum of *P. nepalensis* sp.nov. is similar to that of *P. monticola*, only in the latter the frontal carinae curve outwards to merge into the costulae, which surround the antennal socket (at least in the investigated paratype specimen). Costulation on head dorsum in *P. snyderi* is somewhat denser – the frons between frontal carinae, level with the eyes, has 14 costulae *versus* 10–11 in *P. nepalensis* sp.nov.

The sculpture of the alitrunk differs between all three species. *P. monticola* differs from both the others in much less developed sculpture on mesopleurae and sides of propodeum, while *P. nepalensis* sp.nov. differs from the two other species in broken transversal costulation on the anterio-dorsal surface of pronotum, and by more irregular sculpture on the alitrunk dorsum (compare Figs 4, 5, 13, 14, 20 and 21).

P. nepalensis sp.nov. has a similarly shaped petiole to that of *P. monticola*, while the petiolar node of *P. snyderi* is more widely rounded, with a more or less distinct, convex dorsal plate (compare Figs 4, 20 and 13).

SMITH (1947) gave no measurements and indices in his description of *P. snyderi*. I therefore measured the holotype and in order to ensure comparability I also re-measured a paratype worker of *P. monticola* (for indices see Table 1):

P. snyderi (holotype worker): HL1 = 0.94, HL2 = 0.98, HW1 = 0.97, HW2 = 1.02, SL = 0.96, OL = 0.14, AL = 1.11, PL = 0.42, PPL = 0.29, PH = 0.30, PPH = 0.33, PW = 0.20, PPW = 0.25, ESL = 0.25, ESD = 0.37, HTL = 0.80, PNW = 0.60 mm [range of polymorphism of this species shown by LONGINO & HARTLEY (1994)].

P. monticola (paratype worker): HL1 = 1.03, HL2 = 1.12, HW1 = 1.08, HW2 = 1.10, SL = 0.99, OL = 0.13, AL = 1.22, PL = 0.44, PPL = 0.30, PH = 0.33, PPH = 0.36, PW = 0.19, PPW = 0.27, ESL = 0.31, ESD = 0.32, HTL = 0.95, PNW = 0.66 mm.

| Indices | <i>P. nepalensis</i> sp.nov. | | | <i>P. snyderi</i> (holotype) | <i>P. monticola</i> (paratype) |
|------------------|------------------------------|-----------|------|---------------------------------|-----------------------------------|
| | holotype | paratypes | mean | | |
| CI ₁ | 0.93 | 0.92–0.94 | 0.93 | 0.96 | 0.95 |
| CI ₂ | 0.98 | 0.97–1.02 | 0.99 | 1.01 | 1.04 |
| CWI | 1.06 | 1.02–1.04 | 1.03 | 1.05 | 1.02 |
| SI | 0.92 | 0.82–0.93 | 0.88 | 0.99 | 0.92 |
| OI | 0.09 | 0.10–0.12 | 0.10 | 0.14 | 0.12 |
| PI ₁ | 0.39 | 0.40–0.43 | 0.41 | 0.48 | 0.43 |
| PI ₂ | 1.39 | 1.38–1.48 | 1.41 | 1.40 | 1.33 |
| PPI ₁ | 0.86 | 0.90–0.96 | 0.91 | 0.86 | 0.90 |
| PPI ₂ | 0.88 | 0.83–0.91 | 0.86 | 0.88 | 0.83 |
| ESLI | 0.27 | 0.19–0.25 | 0.24 | 0.26 | 0.29 |
| ESDI | 1.14 | 1.22–1.76 | 1.40 | 1.48 | 1.03 |

Table 1. Indices calculated for the holotype and paratype workers of the species of the genus *Perissomyrmex* Smith.

A key to identification of *Perissomyrmex* species

1. Antennae and legs with long, standing hairs (Figs 6–8, 15–17). 2.
- Antennae and legs with much shorter standing hairs (Figs 22–24).
..... *P. monticola* de Andrade, 1993
- 2(1) Central pair of clypeal lobes short (Figs 11, 12). Sculpture on head dorsum denser, frons between frontal carinae level with the eyes, having not less than 14 costulae (Fig. 11). Appendages dark brown.
..... *P. snyderi* Smith, 1947
- Central pair of clypeal lobes long (Figs 1, 2). Sculpture on head dorsum sparser, frons between frontal carinae level with the eyes, having 10–11 costulae (Fig. 1). Appendages brownish-yellow.
..... *P. nepalensis* sp.nov.

In conclusion, I suggest that the discovery of a second species of *Perissomyrmex* in tropical Asia, which generally more resembles the Neotropical *P. snyderi* than the Bhutanese *P. monticola*, supports an Old World origin for this genus, as hypothesised by BARONI URBANI & DE ANDRADE (1993).

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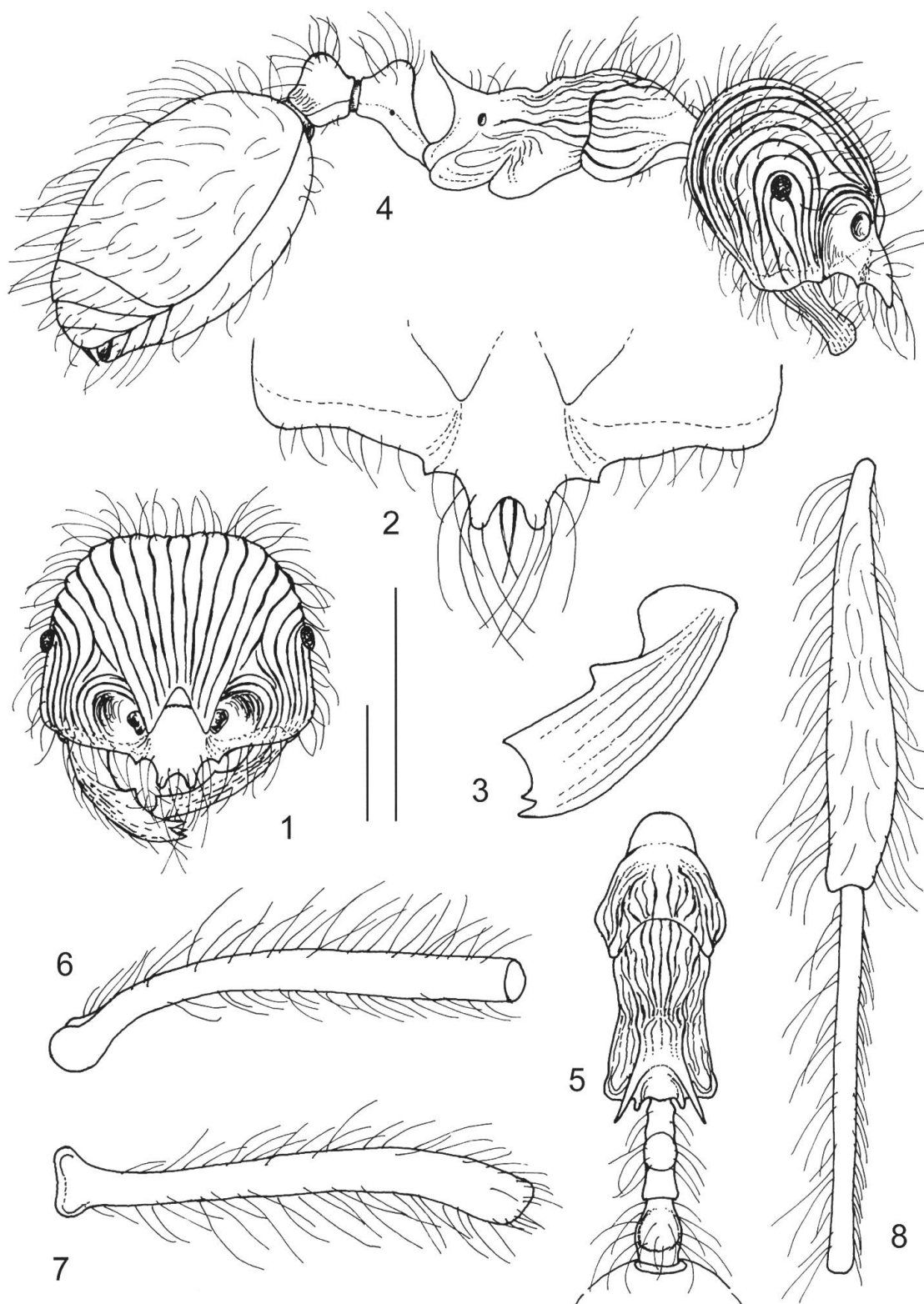
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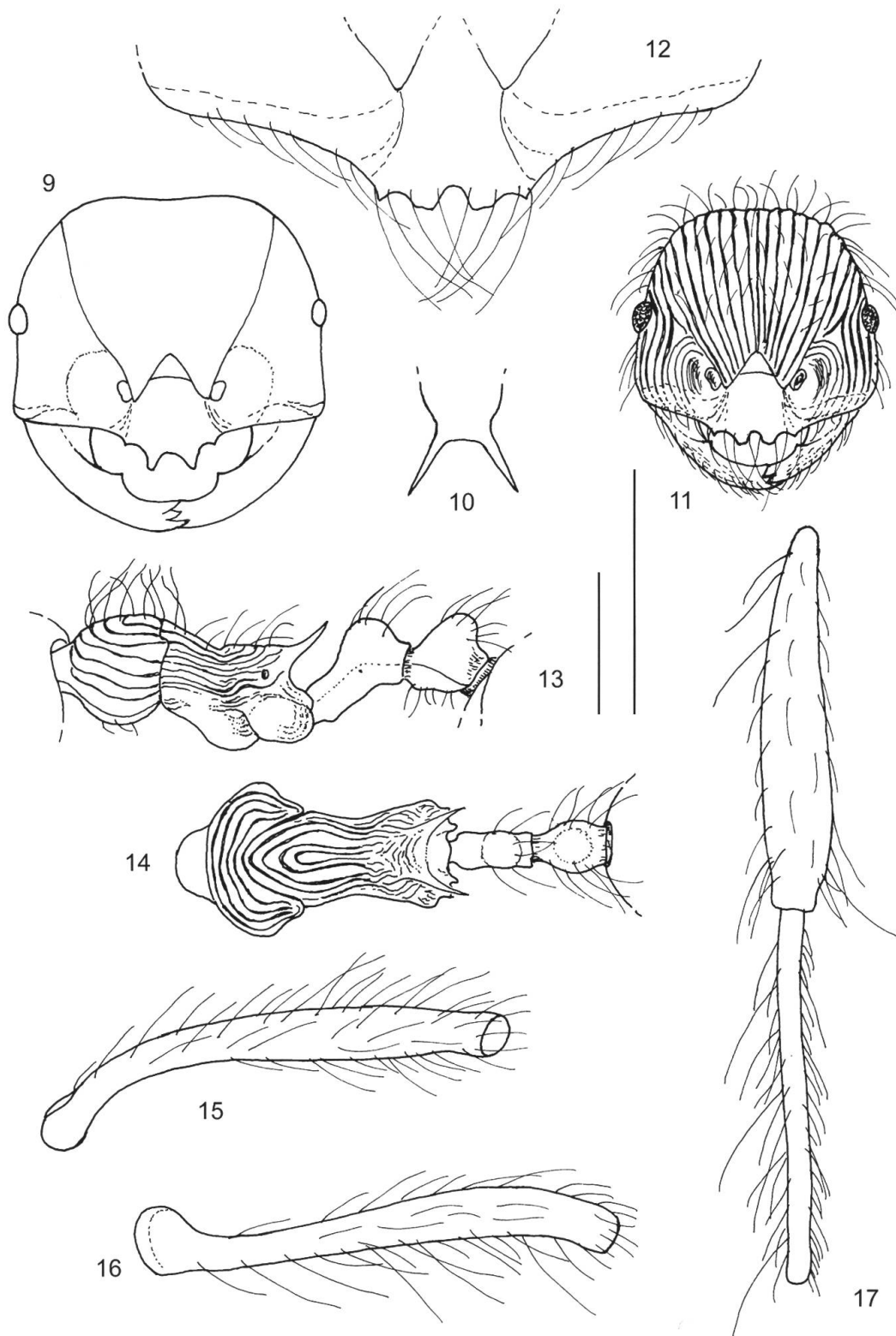
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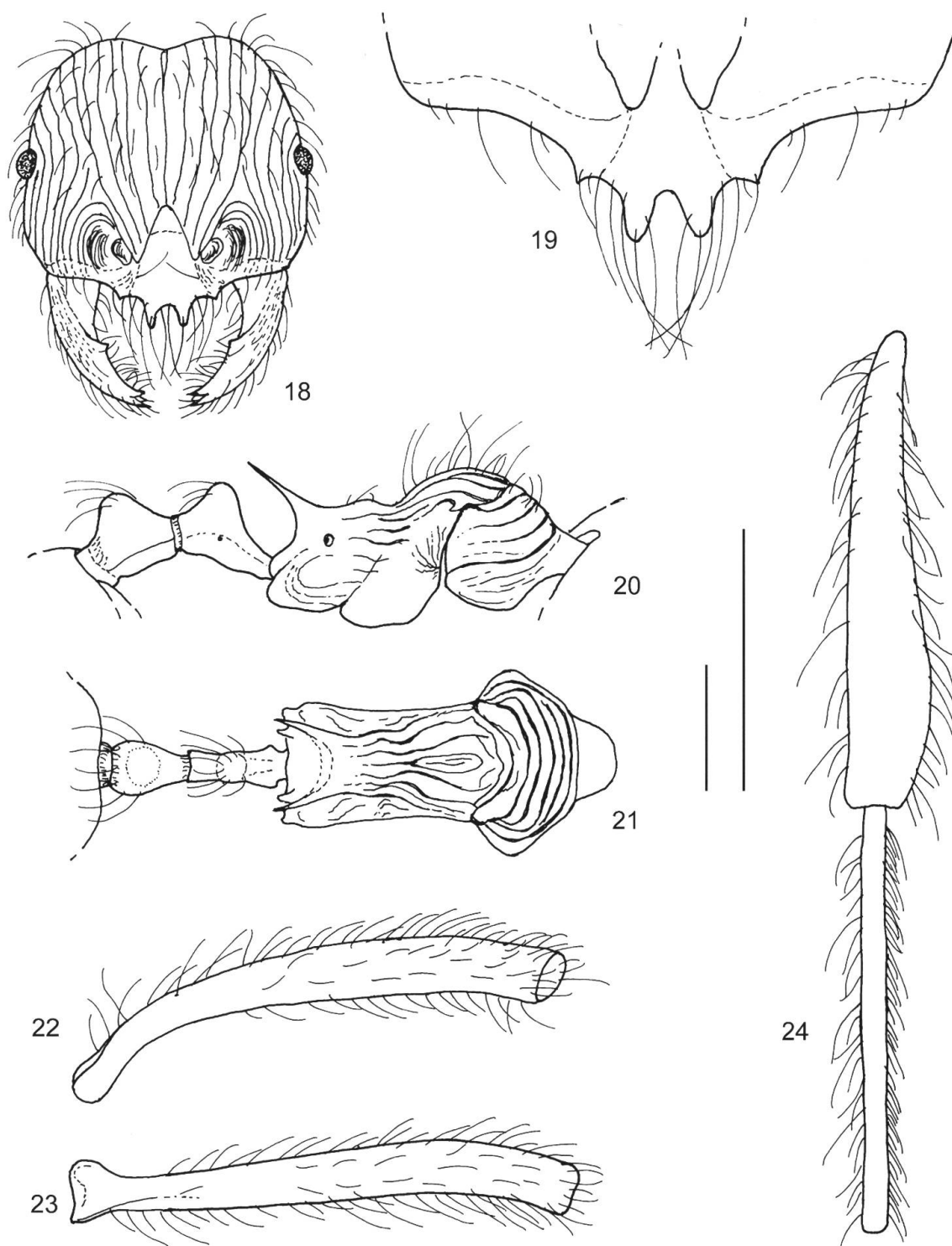
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Figs 1–8. Details of structure of *P. nepalensis* sp.nov. (holotype worker): 1, head, frontal view; 2, lower part of clypeus; 3, mandible (pilosity omitted); 4, body in profile; 5 alitrunk and waist from above; 6, antennal scape, lateral view; 7, antennal scape, dorsal view; 8, tibia and first tarsal joint of hind leg. Scale lines = 2 mm; short line: Figs 1, 4, 5; long line: Figs 2, 3, 6–8.



Figs 9–17. Details of structure of *P. nepalensis* sp.nov. (Figs 9–10: paratype worker) and *P. snyderi* Smith (Figs 11–17: holotype worker): 9, 11, head, frontal view (on Fig. 9 sculpture and pilosity omitted); 10, propodeal spine from above; 12, lower part of clypeus; 13, alitrunk and waist in profile; 14, alitrunk and waist from above; 15, antennal scape, lateral view; 16, antennal scape, dorsal view; 17, tibia and first tarsal joint of hind leg. Scale lines = 2 mm; short line: Figs 9–11, 13, 14; long line: Figs 12, 15–17.



Figs 18–24. Details of structure of *P. monticola* de Andrade (paratype worker): 18, head, frontal view; 19, lower part of clypeus; 20, alitrunk and waist in profile; 21, alitrunk and waist from above; 22, antennal scape, lateral view; 23, antennal scape, dorsal view; 24, tibia and first tarsal joint of hind leg. Scale lines = 2 mm; short line: Figs 18, 20, 21; long line: Figs 19, 22–23.