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## FIRST DESCRIPTIONS OF THE SEXUAL FORMS OF SEVEN HIMALAYAN *MYRMICA* SPECIES (HYMENOPTERA, FORMICIDAE)

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**First Description of the Sexual Forms of Seven Himalayan *Myrmica* Species (Hymenoptera, Formicidae).**  
**Radchenko A. G., Elmes G. W.** — First descriptions of queens of seven of *Myrmica* ant species and males of four of these species are given. The species were first described between 1865 and 1947 from workers. They form part of the distinctive Himalayan *Myrmica* fauna that inhabit the south-western slopes of the Himalaya. Drawings, measurements and indices of the specimens are provided and the key characters that distinguish them from the other related Himalayan *Myrmica* species are noted.

Key words: ants, Formicidae, *Myrmica*, Himalaya, sexual forms, first descriptions.

**Первоописания половых форм семи Гималайских видов *Myrmica* (Hymenoptera, Formicidae).** Радченко А. Г., Элмс Г. В. — В статье приведены первоописания самок семи и самцов четырех видов *Myrmica*. Эти виды были описаны по рабочим в период между 1865 и 1947 г. Все они составляют часть фауны мирмик, населяющих юго-западный макросклон Гималаев. Приведены рисунки, промеры и индексы описываемых форм, а также дано их сравнение с близкими видами.

Ключевые слова: муравьи, Formicidae, *Myrmica*, Гималаи, половые формы, первоописание.

### Introduction

In a taxonomic revision of the ants of the genus *Myrmica* Latreille from the Himalaya and adjacent territories of India, Pakistan and Afghanistan (Radchenko, Elmes, 2001) we showed that the 30 species, which live on the south-western slopes, form a distinct fauna, which we termed Himalayan *Myrmica*. Only two Himalayan *Myrmica* species are represented in the fauna of Central Asia. Fifteen of the 30 species were described as new (Radchenko, Elmes, 1998, 1999). Prior to our revision 22 species had been described, 21 of them in the period 1865 and 1947; we considered that 7 of these names were synonyms and therefore reduced these “old species” to fifteen. The sexual forms of many old species were considered to be unknown but when we examined museums material for our revision, we found undescribed sexual castes of seven species: *M. tenuispina* Forel (♀), *M. inezae* Forel (♀), *M. smythiesii* Forel (♀), *M. fortior* Forel (♂, ♀), *M. rugosa* Mayr (♂, ♀), *M. hecate* Weber (♂, ♀) and *M. rupestris* Forel (♂, ♀). We formally describe them below.

Based mainly on workers, *M. rupestris*, *M. rugosa* and *M. hecate* were grouped together in the *rugosa*-group and *M. smythiesii* and *M. fortior* in the *smythiesii*-group, while *M. tenuispina* and *M. inezae* belong to other separate and distinctive groups (Radchenko, Elmes, 2001). In the notes following the descriptions below, we pay particular attention to differences between the species belonging to the same groups. Following our previous studies of Himalayan *Myrmica* we made up to 21 body measurements (mm), which we use to calculate a variety of indices (see Radchenko, Elmes, 1998, 1999, 2001 for details of indices and collections examined).

### *Myrmica tenuispina* Forel, 1904

Material. 4 queens, Afghanistan, Badakshan, Sarekanda, 4100 m, 18.07.1953 leg. Klaepperich (NHMB).

Queens (first description) (fig. 1, 1–4). Head subrectangular, with parallel sides, straight occipital margin and broadly rounded occipital corners; anterior clypeal margin prominent, narrowly rounded. Frons relatively wide; frontal carinae slightly divergent posteriorly and abruptly curved aside anteriorly, making the frontal lobes appear dis-

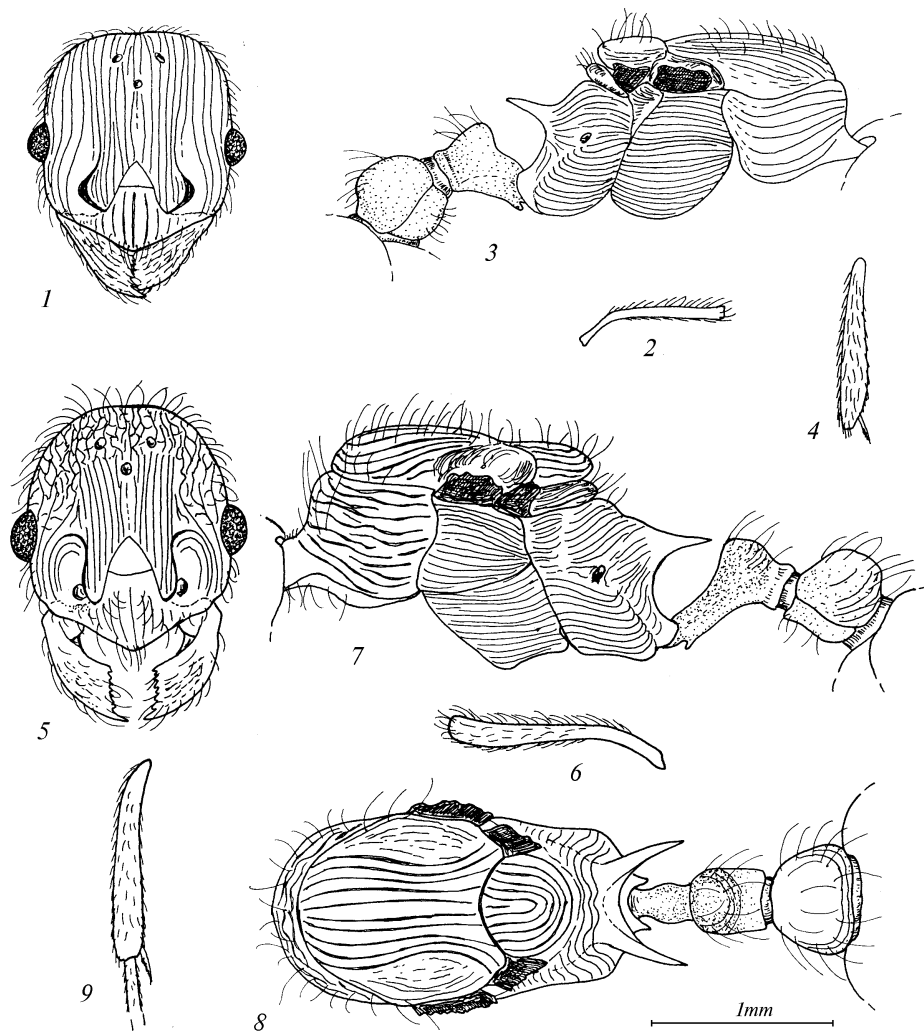


Fig. 1. Details of structure of *Myrmica tenuispina* (1-4) and *M. inezae* (5-9), queens: 1, 5 — head, frontal view; 2, 6 — antennal scape; 3, 7 — alitrunk and waist in profile; 4, 9 — hind tibia; 8 — alitrunk and waist from above.

Рис. 1. Детали строения *Myrmica tenuispina* (1-4) и *M. inezae* (5-9), самки: 1, 5 — голова спереди; 2, 6 — скапус антенн; 3, 7 — грудь и стебелек в профиль; 4, 9 — задняя голень; 8 — грудь и стебелек сверху.

tinct, subsquare. Antennal scape thin, slender, relatively long but shorter than head width, weakly curved at the base, with no trace of angle or lobe; 3-5<sup>th</sup> funicular joints long (more than 1.5 times longer than broad), apical club 4-jointed. Alitrunk long, low and narrow. In profile, propodeal spines relatively long and blunt, more or less straight and only slightly broadening at the base, projecting posteriorly and slightly curved inwards (seen from above); petiole relatively long, distinctly longer than height, anterior surface strongly concave, node cuneiform with narrowly rounded dorsum; postpetiole relatively wide, subglobular.

Antennal sockets not surrounded by rugae; head dorsum coarsely longitudinally rugose, only temples with sinuous rugae; mandibles densely finely longitudinally rugulose; clypeus with longitudinal carinae; surface between rugae and frontal triangular smooth and shiny. Scutum longitudinally rugose; scutellum finely superficially striated, more or less smooth and shiny; sides of alitrunk longitudinally rugose. Petiole and

postpetiole with fine short superficial longitudinal striation and punctures, but appearing more or less shiny, not dull. Margins of head with abundant, relatively long subdecumbent hairs; body with numerous straight hairs, longer on alitrunk and waist; legs with decumbent hairs; antennal scape with subdecumbent hairs. Colour generally yellowish red with head dorsum and patches on alitrunk red to brownish red.

HL 1.17–1.20; HW 1.01–1.02; SL 0.92–0.95; AL 1.88–1.95; HTL 0.90–0.92; CI 1.14–1.19; FI 0.44–0.45; FLI 1.27–1.29; SI<sub>1</sub> 0.77–0.81; SI<sub>2</sub> 0.92–0.93; PI<sub>1</sub> 1.23–1.29; PI<sub>2</sub> 0.50–0.51; PPI<sub>1</sub> 0.92–0.93; PPI<sub>2</sub> 0.91–0.96; PPI<sub>3</sub> 1.73–1.79; ESLI 0.28–0.32; ESDI 1.61–1.70; AI 1.76–1.78; SCI 1.54–1.57; HTI 0.90–0.91.

Notes. Bolton (1995: 284) erroneously noted that queens of this species were first described by Arnoldi (Арнольди, 1976) who in fact, first described males. Queens (and also workers) differ from all other Himalayan *Myrmica* by the shape of frontal carinae, which are strongly curved outwards in their anterior third, to form distinctive wide, subsquare frontal lobes (FLI > 1.25 versus FLI < 1.17 in all other species).

### *Myrmica inezae* Forel, 1902

Material. 1 queen (dealate), India, Himachal Pradesh, vic. Theong, 25 km E Shimla, 2400 m, 29.09.1996, N 399, leg. Schulz and Vock (SCHULZ).

Queen (first description) (fig. 1, 5–9). Head suboval, with very feebly convex sides and occipital margin, broadly rounded above eyes, without distinct occipital corners; anterior clypeal margin prominent, narrowly rounded; frontal carinae short, more or less straight, curved outwards to merge with rugae which surround antennal sockets; frons wide. Antennal scape long, longer than head width, weakly curved at the base, with no trace of angle or lobe, 3–5<sup>th</sup> funicular joints short, < 1.5 times longer than broad; apical club 4-jointed. Alitrunk long, relatively low and narrow. In profile, propodeal spines long, straight, sharp, broadened at the base, projecting posteriorly and slightly divergent (seen from above); petiole with very long and thin peduncle, its anterior surface strongly concaved, node dorsum flattened; postpetiole subglobular, quite wide, its ventral surface only slightly convex.

Frons and clypeus coarsely longitudinally rugose, other parts of head dorsum with coarse reticulate sculpture; frontal triangular smooth and shiny; mandibles coarsely longitudinally rugulose, masticatory margin with 8–9 teeth. Scutum and scutellum coarsely longitudinally rugose; sides of alitrunk with less coarse rugulosity, pronotum with sinuous rugae and coarse reticulation. Petiole densely punctured, node also has rugae; sides of postpetiole finely punctured, with a few rugae on posterior part, but dorsum smooth and shiny. Margins of head, alitrunk, waist and gaster with numerous long suberect hairs; appendages with long abundant subdecumbent to suberect pilosity. Colour of alitrunk and legs reddish brown, mandibles and antennae ochreous red, head, waist and gaster brownish black.

HL 1.34; HW 1.06; SL 1.09; AL 2.11; HTL 1.12; CI 1.26; FI 0.42; FLI 1.05; SI<sub>1</sub> 0.81; SI<sub>2</sub> 1.03; SCI 1.57; PI<sub>1</sub> 1.63; PI<sub>2</sub> 0.68; PPI<sub>1</sub> 0.92; PPI<sub>2</sub> 0.91; PPI<sub>3</sub> 1.62; ESLI 0.41; ESDI 0.76; AI 1.61; SCI 1.57; HTI 1.05.

Notes. Males are unknown. Queen differs from the queens of most other species (except those of the *ritae*-group) by the general shape of the petiole, especially the long thin peduncle (which is less extremely elongate than most *ritae*-group species), the long and divergent propodeal spines, the suboval head without distinct occipital corners, and long pilosity on head margins.

### *Myrmica smythiesii* Forel, 1902

Material. 2 queens, India, Yangti, Almora UP, 12300 ft, 18.07.1923, N 52, 53, leg. Parker (UMO).

Queens (first description) (fig. 2, 1–4). Head subrectangular, with feebly convex sides and occipital margin, and narrowly rounded occipital corners; anterior clypeal

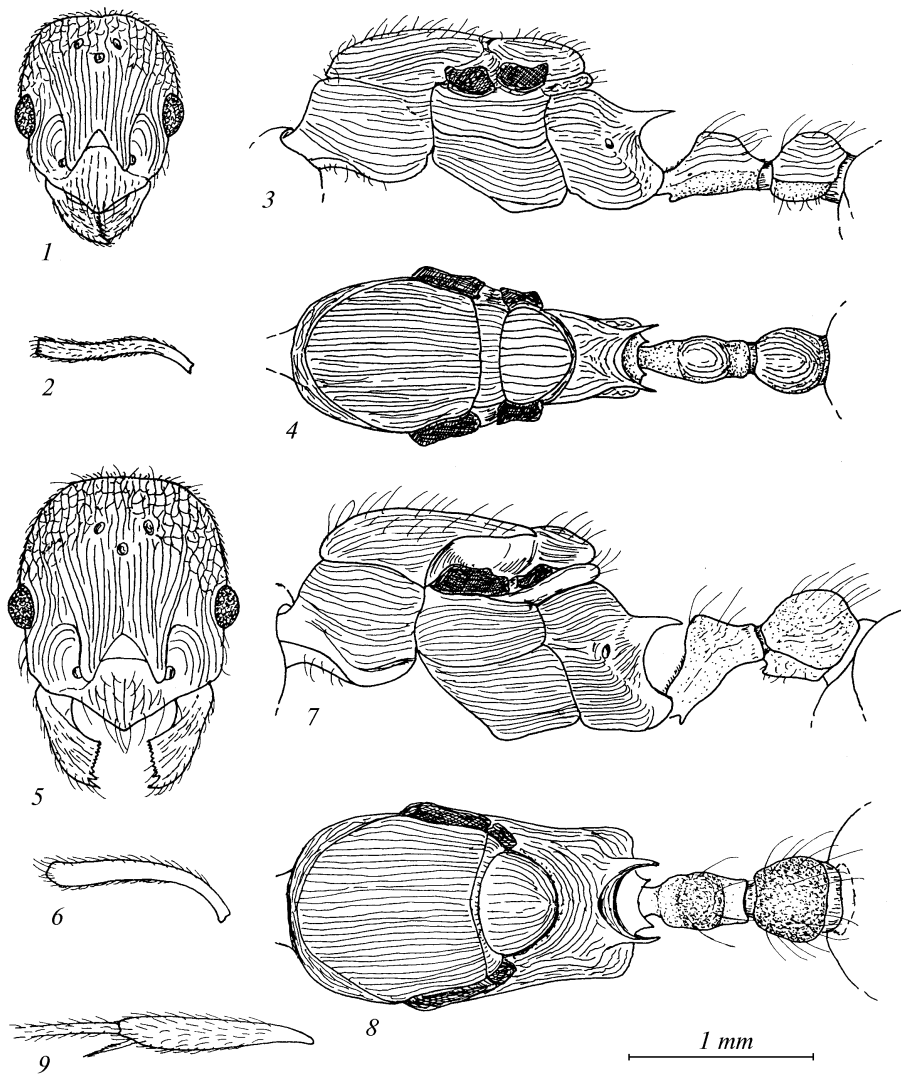


Fig. 2. Details of structure of *Myrmica smythiesii* (1-4) and *M. hecate* (5-9), queens: 1, 5 — head, frontal view; 2, 6 — antennal scape; 3, 7 — alitrunk and waist in profile; 4, 8 — alitrunk and waist from above; 9 — hind tibia.

Рис. 2. Детали строения *Myrmica smythiesii* (1-4) и *M. hecate* (5-9), самки: 1, 5 — голова спереди; 2, 6 — скапус антенн; 3, 7 — грудь и стебелек в профиль; 4, 8 — грудь и стебелек сверху; 9 — задняя голень.

margin prominent and pointed medially; frons wide; frontal carinae almost straight, not curved outwards. Antennal scape relatively long, but shorter than head width, weakly curved at the base, with no trace of angle or lobe, 3-5<sup>th</sup> funicular joints < 1.5 times longer than broad, apical club 4-jointed. Alitrunk long and relatively narrow. In profile, propodeal spines relatively short, sharp, slightly broadened at the base and projecting posteriorly. Petiole low and relatively long, its anterior surface distinctly concave, node dorsum distinctly flattened; postpetiole relatively narrow, subglobular.

Antennal sockets surrounded by rugae; frons and clypeus longitudinally rugulose, upper third of head dorsum with sinuous rugae and reticulation; mandibles longitudinally rugulose, masticatory margin with 7-8 teeth. Scutum and scutellum longitudinally rugose; sides of alitrunk with similar sculpture; anterior surface of pronotum with sinuous rugae. Petiole and postpetiole longitudinally-concentric rugose. Surfaces be-

tween rugae of head, alitrunk and waist very finely superficially punctured, appearing shiny. Occipital margin and lateral margins of head above eyes with short subdecumbent hairs; genae with a few longer hairs; alitrunk, waist and gaster with numerous long suberect hairs; tibiae and antennal scape with decumbent to subdecumbent pilosity. Colour reddish brown, appendages somewhat lighter.

HL 1.24; HW 1.00–1.06; SL 0.94–0.98; AL 2.08–2.18; HTL 0.92–0.98; CI 1.19–1.24; FI 0.43–0.45; FLI 1.02; SI<sub>1</sub> 0.76–0.79; SI<sub>2</sub> 0.90–0.98; PI<sub>1</sub> 1.40–1.56; PI<sub>2</sub> 0.59–0.62; PPI<sub>1</sub> 0.75–0.89; PPI<sub>2</sub> 0.96–1.06; PPI<sub>3</sub> 1.41–1.45; ESLI 0.18–0.22; ESDI 1.95–2.32; AI 1.76–1.79; SCI 1.42–1.43; HTI 0.92–0.94.

Notes. Apart from their generally smaller size, *M. smythiesii* differ from *M. fortior* queens by frontal carinae not curved outwards; the antennal socket surround by rugae which merge with those of the head.

### *Myrmica fortior* Forel, 1904

Material. 1 queen (dealate), India, Kashmir, Pahalgam, 34° 02' N, 75° 19' E, 2100 m, 27.07.1978, N 3010, leg. Ward; 5 queens (alate), 3 ♂, Kashmir, Lidderwatt, 34° 09' N, 75° 15' E, 2700 m, 30.07.1978, N 3018, 3018 B, leg Ward (BMNH, IZK, ELMES, WARD).

Queens (first description) (fig. 3, 1–5). Head subrectangular, with feebly convex to straight sides, more or less straight occipital margin and broadly rounded occipital corners, anterior clypeal margin prominent and pointed medially (but less pointed than in *M. rugosa*); frons wide, frontal carinae short, almost straight, curved outwards to merge with rugae which surround antennal sockets. Antennal scape shorter than head width, weakly curved at the base, with no trace of angle or lobe, 3–5<sup>th</sup> funicular joints about 1.5 times longer than broad, apical club 4-jointed. Alitrunk relatively long but wide. In profile, propodeal spines relatively short, quite blunt, broadened at base, projecting posteriorly; petiole relatively short, with distinct peduncle; its anterior surface concave; node dorsum distinctly flattened, intersection of dorsal and anterior surfaces more or less right angled; postpetiole subglobular.

Frons and clypeus coarsely longitudinally rugose, other parts of head dorsum with reticulation; mandibles longitudinally rugulose, masticatory margin with 7–8 teeth. Scutum and scutellum coarsely longitudinally rugose; sides of alitrunk with less coarse rugosity; anterior surface of pronotum with sinuous rugae and reticulation. Petiole and postpetiole with longitudinally-concentric rugulae. Surfaces between rugae of head, alitrunk and waist very finely superficially punctured, appearing shiny. Occipital and lateral margins of head with relatively short outstanding hairs and subdecumbent pilosity. Alitrunk, waist and gaster with numerous long, suberect hairs. Appendages with numerous subdecumbent to suberect straight hairs. Colour yellowish red.

HL 1.20–1.36; HW 1.01–1.09; SL 0.85–1.03; AL 1.85–2.02; HTL 0.91–1.04; CI 1.16–1.29; FI 0.40–0.46; FLI 1.03–1.07; SI<sub>1</sub> 0.70–0.82; SI<sub>2</sub> 0.84–1.00; PI<sub>1</sub> 1.25–1.50; PI<sub>2</sub> 0.48–0.58; PPI<sub>1</sub> 0.77–0.99; PPI<sub>2</sub> 0.90–1.05; PPI<sub>3</sub> 1.45–1.62; ESLI 0.23–0.51; ESDI 1.79–2.15; AI 1.61–1.62; SCI 1.40–1.46; HTI 0.89–1.00.

Males (first description) (fig. 3, 6–10). Head longer than broad, sides and occipital margins convex, occipital corners rounded; anterior clypeal margin prominent and pointed medially. Antennal scape relatively long, approximately equal to sum of first four funicular joints, feebly curved at the base, antennal club 5-jointed. Masticatory margin of mandibles distinct, with 5–6 smaller acute teeth and longer apical tooth. Alitrunk relatively long and wide; scutum convex; propodeum angularly rounded or with blunt tubercles. In profile, petiole distinctly longer than high, peduncle relatively short and quite narrow, anterior surface more or less flat or very feebly concave and posterior surface convex, node dorsum broadly rounded, but somewhat flattened; postpetiole slightly longer than high, appearing low, with flattened dorsum.

Frons longitudinally rugose with surface between rugae finely punctured, appearing more or less shiny; frontal triangular densely punctured, appearing dull, poster-

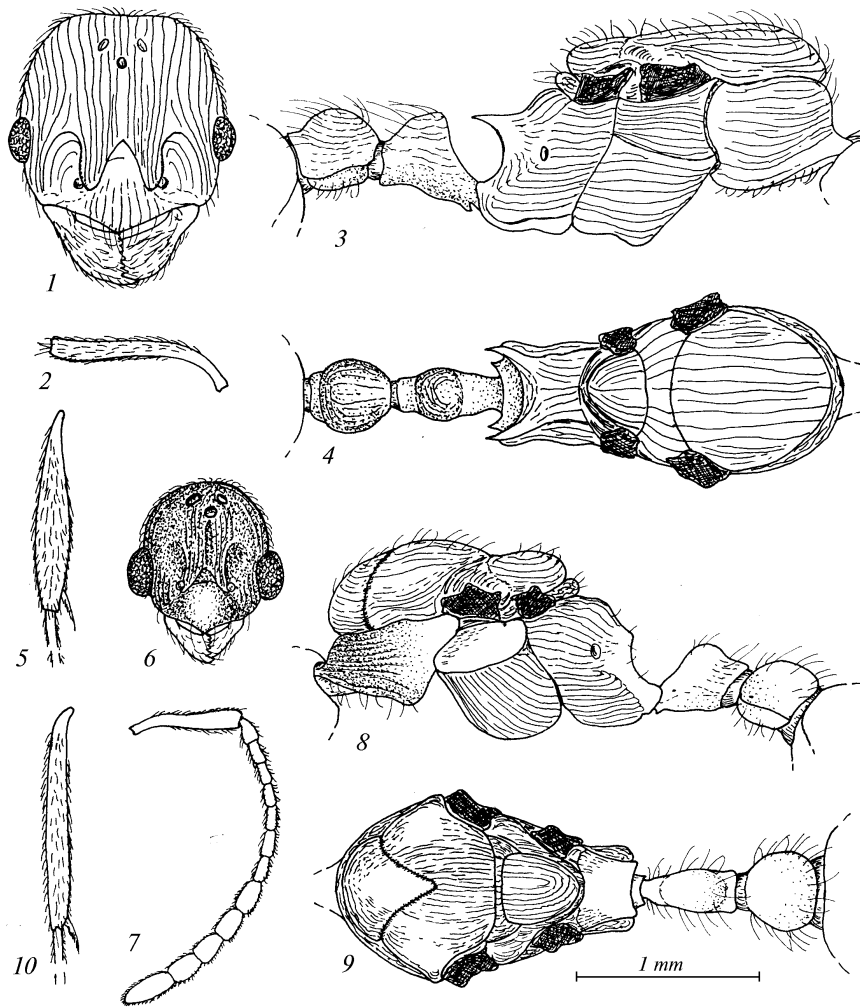


Fig. 3. Details of structure of *Myrmica fortior* (1–5, queen, 6–10, male): 1, 6 — head, frontal view; 2 — antennal scape; 3, 8 — alitrunk and waist in profile; 4, 9 — alitrunk and waist from above; 5, 10 — hind tibia; 7 — antenna.

Рис. 3. Детали строения *Myrmica fortior* (1–5, самка, 6–10, самец): 1, 6 — голова спереди; 2 — скапус антенн; 3, 8 — грудь и стебелек в профиль; 4, 9 — грудь и стебелек сверху; 5, 10 — задняя голень; 7 — антенна.

olateral parts of head dorsum densely and coarsely punctured, clypeus finely punctured. Central part of scutum coarsely longitudinally rugulose, other parts smooth and shiny; scutellum concentrically rugulose; sides of alitrunk longitudinally rugulose, shiny with no punctures on surfaces between rugae. Petiole, postpetiole and gaster smooth and shiny. Margins of head with abundant hairs; alitrunk, petiole, postpetiole and gaster with long thin suberect hairs; legs and antennal scape with numerous subdecumbent straight hairs. Colour brownish red.

HL 0.83–0.94; HW 0.71–0.78; SL 0.56–0.62; AL 1.75–1.94; HTL 1.15–1.20; CI 1.11–1.21; SI<sub>1</sub> 0.61–0.73; SI<sub>2</sub> 0.74–0.81; PI<sub>1</sub> 1.41–1.56; PI<sub>2</sub> 0.66–0.71; PPI<sub>1</sub> 0.74–0.88; PPI<sub>2</sub> 0.93–1.05; PPI<sub>3</sub> 1.50–1.55; AI 1.57–1.58; SCI 1.26–1.36; HTI 1.47–1.69.

Notes. Queens of *M. fortior* differ from *M. smythiesii* and all species described below by frontal carinae curved outwards to merge with rugae which surround antennal sockets; males differ from those of other species described below by distinctly longer antennal scape (SI<sub>1</sub> > 0.60, SI<sub>2</sub> > 0.73 versus SI<sub>1</sub> < 0.57, SI<sub>2</sub> < 0.70).

***Myrmica rugosa* Mayr, 1865**

Material. 2 queens, Bhutan, 20 km S Thimphu, 2440 m, 16.04.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972); 3 queens, ♂, same locality, 31.05.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972); 2 ♂, Diechli Paka, 3300 m, 19–20.06.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972); 2 queens, 13 ♂, Tanglu, 22 km W Thimphu, 2600–2800 m, 30.06.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972) (NHMB, ELMES).

Queens (first description) (fig. 4, 1–5). Head subrectangular, with slightly convex sides, feebly convex occipital margins and narrowly rounded occipital corners; anterior clypeal margin prominent and pointed medially; frons wide; frontal carinae almost straight, not curved outwards. Antennal scape shorter than head width, weakly curved at the base, with no trace of angle or lobe; 3–5<sup>th</sup> funicular joints less than

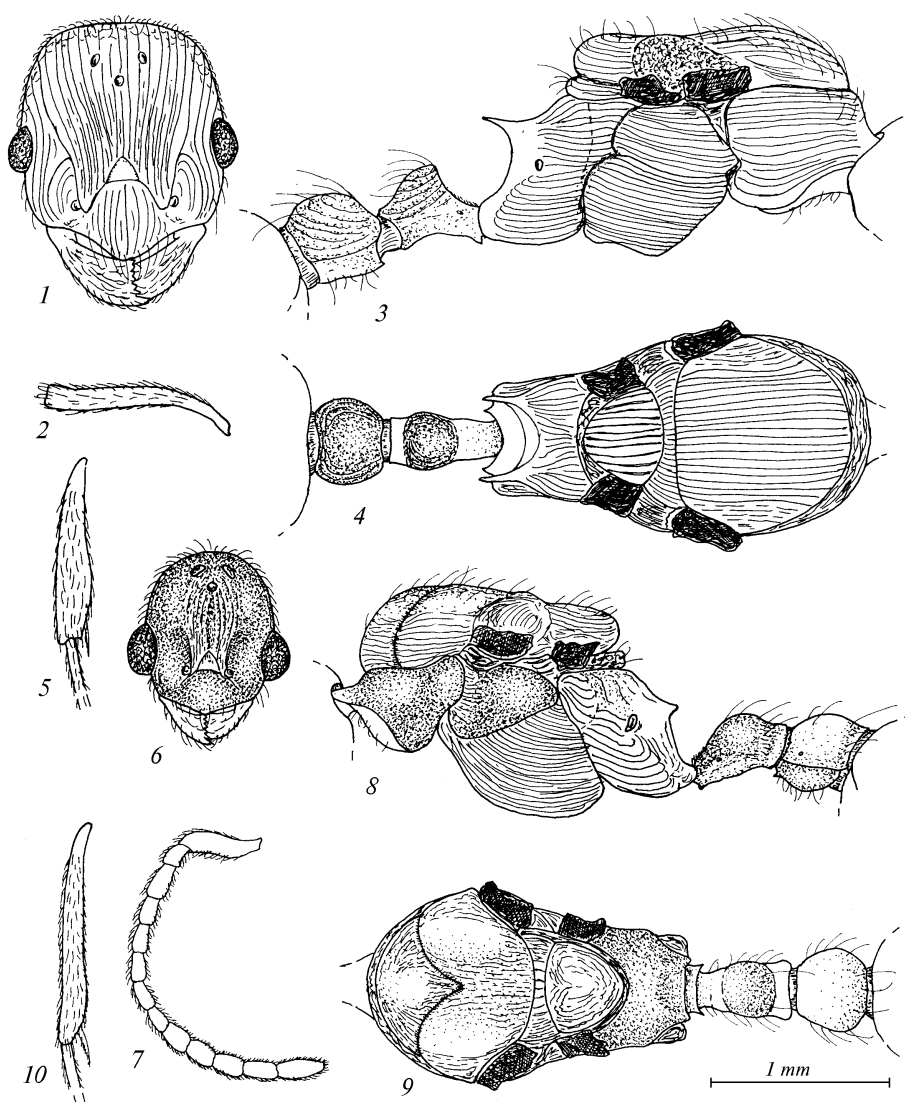


Fig. 4. Details of structure of *Myrmica rugosa* (1–5, queen, 6–10, male): 1, 6 — head, frontal view; 2 — antennal scape; 3, 8 — alitrunk and waist in profile; 4, 9 — alitrunk and waist from above; 5, 10 — hind tibia; 7 — antenna.

Рис. 4. Детали строения *Myrmica rugosa* (1–5, самка, 6–10, самец): 1, 6 — голова спереди; 2 — скапус антенн; 3, 8 — грудь и стебелек в профиль; 4, 9 — грудь и стебелек сверху; 5, 10 — задняя голень; 7 — антенна.

1.5 times longer than broad; apical club 4-jointed. Alitrunk relatively long and wide. In profile, propodeal spines relatively short but sharp, broadened at the base and projecting posteriorly; petiole low and relatively long, with long peduncle, its anterior surface sharply concave, petiolar node subtriangular with weakly convex dorsum; postpetiole relatively narrow, appearing subglobular, ventral surface flattened.

Antennal sockets surrounded by rugae; head dorsum, including clypeus, longitudinally rugose, without reticulation; mandibles longitudinally rugulose, masticatory margin with 7–8 teeth. Scutum and scutellum longitudinally rugose; sides of alitrunk with slightly less coarse rugosity; anterior surface of pronotum with sinuous rugae. Petiole and postpetiole with longitudinally-concentric rugosity. Surfaces between rugae of head, alitrunk and waist very finely superficially punctured, appearing shiny. Occipital margin of head and genae with sparse hairs, lateral margins above eyes only with very short, microscopic decumbent pilosity; alitrunk, waist and gaster with numerous long suberect hairs; tibiae and antennal scape with decumbent to subdecumbent pilosity. Colour brownish black, appendages dark reddish brown.

HL 1.32–1.44; HW 1.06–1.26; SL 0.99–1.22; AL 2.13–2.68; HTL 1.02–1.24 mm; CI 1.18–1.26; FI 0.45–0.47; FLI 1.00–1.07; SI<sub>1</sub> 0.72–0.77; SI<sub>2</sub> 0.88–0.93; PI<sub>1</sub> 1.22–1.56; PI<sub>2</sub> 0.48–0.64; PPI<sub>1</sub> 0.82–0.90; PPI<sub>2</sub> 0.95–1.07; PPI<sub>3</sub> 1.47–1.56; ESLI 0.21–0.38; ESDI 1.52–2.17; AI 1.52–1.67; SCI 1.33–1.56; HTI 0.85–0.98.

Males (first description) (fig. 4, 6–10). Head distinctly longer than broad, with feebly convex sides and occipital margin and broadly rounded occipital corners; anterior clypeal margin prominent and pointed medially. Antennal scape relatively short, distinctly shorter than sum of first four funicular joints, feebly curved at the base, antennal club 5-jointed. Masticatory margin of mandibles distinct, with 5–6 smaller acute teeth and a longer apical tooth. Alitrunk relatively long, low and wide; scutum convex; propodeum with blunt tubercles or with short acute denticles. In profile, petiole distinctly longer than high with short, thick but distinct peduncle, its anterior surface more or less flat, or only very feebly concave, posterior surface convex, node of dorsum broadly rounded; postpetiole shorter than high, dorsum slightly flattened.

Frons and frontal triangular longitudinally rugulose, surfaces between rugae densely punctured; posterolateral parts of head dorsum densely and coarsely punctatogranulate; clypeus finely punctured. Scutum and scutellum longitudinally rugulose, surface between Mayr's furrows finely punctato-striated; sides of alitrunk longitudinally ruguloso-striated and punctured. Petiole and postpetiole very finely punctured, appearing more or less shiny. Margins of head with abundant hairs; alitrunk, petiole, postpetiole and gaster with long thin suberect hairs; legs and antennal scape with numerous subdecumbent straight hairs. Colour from reddish brown to brown.

HL 0.89–0.95; HW 0.74–0.81; SL 0.36–0.43; AL 1.85–2.06; HTL 1.16–1.21; CI 1.16–1.19; SI<sub>1</sub> 0.41–0.48; SI<sub>2</sub> 0.48–0.57; PI<sub>1</sub> 1.19–1.32; PI<sub>2</sub> 0.60–0.68; PPI<sub>1</sub> 0.91–0.94; PPI<sub>2</sub> 1.00–1.07; PPI<sub>3</sub> 1.34–1.50; AI 1.47–1.61; SCI 1.28–1.42; HTI 1.48–1.56.

Notes. Queens of *M. rugosa* differ from those of *M. rupestris*, *M. hecate* and *M. smythiesii* by a longitudinally rugose head dorsum and no reticulation on rear part of head. Generally males of *M. rupestris*, *M. hecate* and *M. smythiesii* are very similar to each other and are difficult to separate. Males of *M. rugosa* differ from those of *M. hecate* by a slightly shorter head and relatively more coarsely sculptured alitrunk, and from *M. rupestris* by the shape of head and details of body sculpture.

### *Myrmica hecate* Weber, 1947

Material. 1 queen, 2 ♂, India, Himachal Pradesh, Kullu Valley, 2–4 km SW Rothang La Pass, 3400–3700 m, 10.10.1996, N 422, 423, leg. Schulz and Vock (SCHULZ).

Queen (first description). Head subrectangular, distinctly longer than broad, with subparallel sides, feebly convex occipital margin and narrowly rounded occipital corners;



anterior clypeal margin prominent and pointed medially; frontal carinae short, almost straight, not curved outwards; antennal sockets surrounded by rugae; frons wide. Antennal scape relatively long, but shorter than head width, weakly curved at the base, with no trace of angle or lobe, 3–5<sup>th</sup> funicular joints < 1.5 times longer than broad, apical club 4-jointed. Alitrunk relatively long and wide. In profile, propodeal spines moderately long, sharp, broadened at the base, projecting posteriorly and curving downwards. Petiole high and relatively short, but with distinct anterior peduncle, its anterior surface distinctly concave, petiolar node subtriangular, with rounded dorsum; postpetiole relatively narrow, subglobular, with more or less flattened ventral surface.

Frons with straight longitudinal rugosity; upper and lateral parts of head dorsum with sinuous rugae and reticulation; clypeus finely longitudinally rugulose; frontal triangular smooth and shiny; mandibles longitudinally rugulose, masticatory margin with 10–12 teeth. Scutum and scutellum longitudinally rugose; sides of alitrunk with slightly less coarse rugosity; anterior surface of pronotum with short sinuous rugae and reticulation. Petiole and postpetiole punctured, but only posterior parts of their sides with short rugae. Surfaces between rugae of head and alitrunk very finely superficially punctured, appearing more or less shiny; gaster smooth and shiny. Occipital margin of head and genae with a few long hairs; lateral margins above eyes with short decumbent pilosity; alitrunk, waist and gaster with numerous long suberect hairs; tibiae and antennal scape with decumbent to subdecumbent pilosity. Colour brownish black, appendages dark brown.

HL 1.34; HW 1.05; SL 1.02; AL 2.16; HTL 1.02; CI 1.28; FI 0.42; FLI 1.05; SI<sub>1</sub> 0.76; SI<sub>2</sub> 0.97; PI<sub>1</sub> 1.34; PI<sub>2</sub> 0.57; PPI<sub>1</sub> 0.94; PPI<sub>2</sub> 1.01; PPI<sub>3</sub> 1.47; ESLI 0.27; ESDI 1.32; AI 1.75; SCI 1.49; HTI 0.97.

Males (first description). Head long, distinctly longer than broad, with very feebly convex sides, convex occipital margin and narrowly rounded occipital corners; anterior clypeal margin prominent and pointed medially. Antennal scape relatively short, slightly shorter than sum of first four funicular joints, feebly curved at the base, antennal club 5-jointed. Masticatory margin of mandibles distinct, with 7–8 smaller acute teeth and longer apical tooth. Alitrunk relatively long and narrow; scutum feebly convex; propodeum with blunt tubercles. In profile, petiole distinctly longer than high, with short, thick but distinct peduncle, anterior surface slightly concave, posterior surface convex, node dorsum broadly rounded; postpetiole shorter than high with slightly flattened dorsum.

Frons longitudinally rugulose, surface between rugae densely punctured; posterior-lateral parts of head densely and coarsely punctato-granulate; clypeus and frontal triangular finely punctured. Scutellum longitudinally rugulose and punctured; scutum mainly smooth and shiny, only its posterior parts with divergent rugulosity; sides of alitrunk longitudinally ruguloso-striated and densely, but not coarsely punctured. Petiole and postpetiole with reduced sculpture, more or less smooth, shiny. Margins of head with abundant suberect hairs; alitrunk, petiole, postpetiole and gaster with long thin suberect hairs; legs and antennal scape with numerous subdecumbent hairs. Colour brownish black.

HL 0.95; HW 0.76–0.77; SL 0.52–0.53; AL 2.07–2.08; HTL 1.19–1.20; CI 1.24–1.26; SI<sub>1</sub> 0.54–0.56; SI<sub>2</sub> 0.69; PI<sub>1</sub> 1.43–1.44; PI<sub>2</sub> 0.72–0.73; PPI<sub>1</sub> 0.86–0.91; PPI<sub>2</sub> 1.03–1.08; PPI<sub>3</sub> 1.41–1.46; AI 1.56–1.59; SCI 1.47–1.49; HTI 1.56–1.57.

Notes. Queens differs from those of *M. rupestris* and *M. smythiesii* by multidentate mandibles, which have more than 10 teeth. They also differ from *M. smythiesii*, which has a petiolar node with distinctly flattened dorsum, by their subtriangular petiolar node with rounded dorsum. They also differ from *M. rupestris* by their smaller size, less coarse body sculpture and differently shaped petiole.

*Myrmica rupestris* Forel, 1902

**Material.** 1 queen, India, Kashmir, Pahalgam, 39° 02' N, 75° 19' E, 27.07.1978, N 3009, leg. Ward; 2 ♂, Nepal, Thodung via Those, 3100 m, 29–31.05.1976, leg. Wittmer and Baroni Urbani; ♂, Nepal, Phulchoki, 2600 m, 11–14.06.1976, leg. Wittmer and Baroni Urbani; 1 queen (dealate), Nepal, Daman, 2400 m, 4.06.1976, leg. Wittmer and Baroni Urbani; 1 queen, Prov. Taplejung, Omje Kharka, NW Yamputh, 2300–2500 m, 1.06.1988, leg. Martens and Schawaller; 2 queens, 20 km Bhutan, S Thimphu, 2400 m, 16.04.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972); 2 queens (dealate), Bhutan, Kotoka-Gogona, 2600–3400 m, 10.06.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972); 1 queen, 4 ♂, Bhutan, Diechli Paka, 3300 m, 19.06.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972); 3 queens, 9 ♂, same locality, 20.06.1972 (Nat.-Hist. Museum Basel — Bhutan Expedition, 1972). (NHMB, ELMES, IZK).

**Queens** (first description) (fig. 5, 1–5). Head subrectangular, with more or less straight sides, very feebly convex occipital margin and broadly rounded occipital corners; anterior clypeal margin prominent and pointed medially. Frons wide, frontal carinae short, almost straight, not curved outwards. Antennal scape relatively thick and long, but usually shorter than head width, weakly curved at the base, with no trace of angle or lobe, 3–5<sup>th</sup> funicular joints < 1.5 times longer than broad, apical club 4-jointed. Alitrunk relatively long and wide. In profile, propodeal spines relatively short, massive, broadened at the base, projecting posteriorly and slightly curved downwards; petiole high and relatively short, with short and thick peduncle, anterior surface very feebly concave, node subtriangular in profile with narrowly rounded dorsum; postpetiole subglobular, relatively narrow.

Antennal sockets surrounded by rugae; head dorsum, including clypeus, coarsely longitudinally rugose, upper parts of temples and occiput with reticulation; mandibles longitudinally rugulose, masticatory margin with 7–8 teeth. Scutum and scutellum coarsely longitudinally rugose; sides of alitrunk with somewhat less coarse rugosity, anterior surface of pronotum with coarse reticulation; petiole and postpetiole coarsely rugose. Surface of head, alitrunk and waist between rugae very finely superficially punctured, appearing shiny. Occipital margin of head and genae with a few long hairs; lateral margins above eyes only with short decumbent pilosity; alitrunk, waist and gaster with numerous long suberect hairs; tibiae and antennal scape with decumbent to subdecumbent pilosity. Colour dark brown, appendages dark reddish brown.

HL 1.29–1.42; HW 1.09–1.13; SL 0.98–1.09; AL 2.20–2.31; HTL 1.01–1.11; CI 1.22–1.30; FI 0.43–0.47; FLI 1.00–1.09; SI<sub>1</sub> 0.74–0.77; SI<sub>2</sub> 0.88–1.00; PI<sub>1</sub> 1.20–1.36; PI<sub>2</sub> 0.50–0.56; PPI<sub>1</sub> 0.76–0.90; PPI<sub>2</sub> 0.98–1.05; PPI<sub>3</sub> 1.44–1.58; ESLI 0.20–0.24; ESDI 1.63–2.17; AI 1.57–1.69; SCI 1.34–1.51; HTI 0.90–1.02.

**Males** (first description) (fig. 5, 6–10). Head distinctly longer than broad, broadly rounded above eyes; anterior clypeal margin prominent and pointed medially, masticatory margin of mandibles distinct, with 5–6 smaller acute teeth and longer apical tooth. Antennal scape relatively short, distinctly shorter than sum of first four funicular joints, feebly curved at the base, antennal club 5-jointed. Alitrunk long and low but wide, scutum convex; propodeum with blunt tubercles or with short acute denticles; metapleural lobes rounded. In profile, petiole distinctly longer than high, with short, thick but distinct peduncle, its anterior surface more or less flat, posterior surface convex, node dorsum broadly rounded; postpetiole shorter than high with flattened dorsum.

Frons and frontal triangular longitudinally rugulose, surface between rugae densely punctured; posterolateral parts of head dorsum densely and coarsely punctato-granulate, clypeus finely punctured. Scutum and scutellum longitudinally rugulose; surface between Mayr's furrows finely punctato-striated; sides of alitrunk longitudinally ruguloso-striated and punctured. Petiole and postpetiole very finely punctured, appearing more or less shiny; gaster smooth and shiny. Margins of head with abundant hairs; alitrunk, petiole, postpetiole and gaster with long thin suberect hairs; legs and antennal scape with numerous subdecumbent straight hairs. Colour from reddish brown to brown.

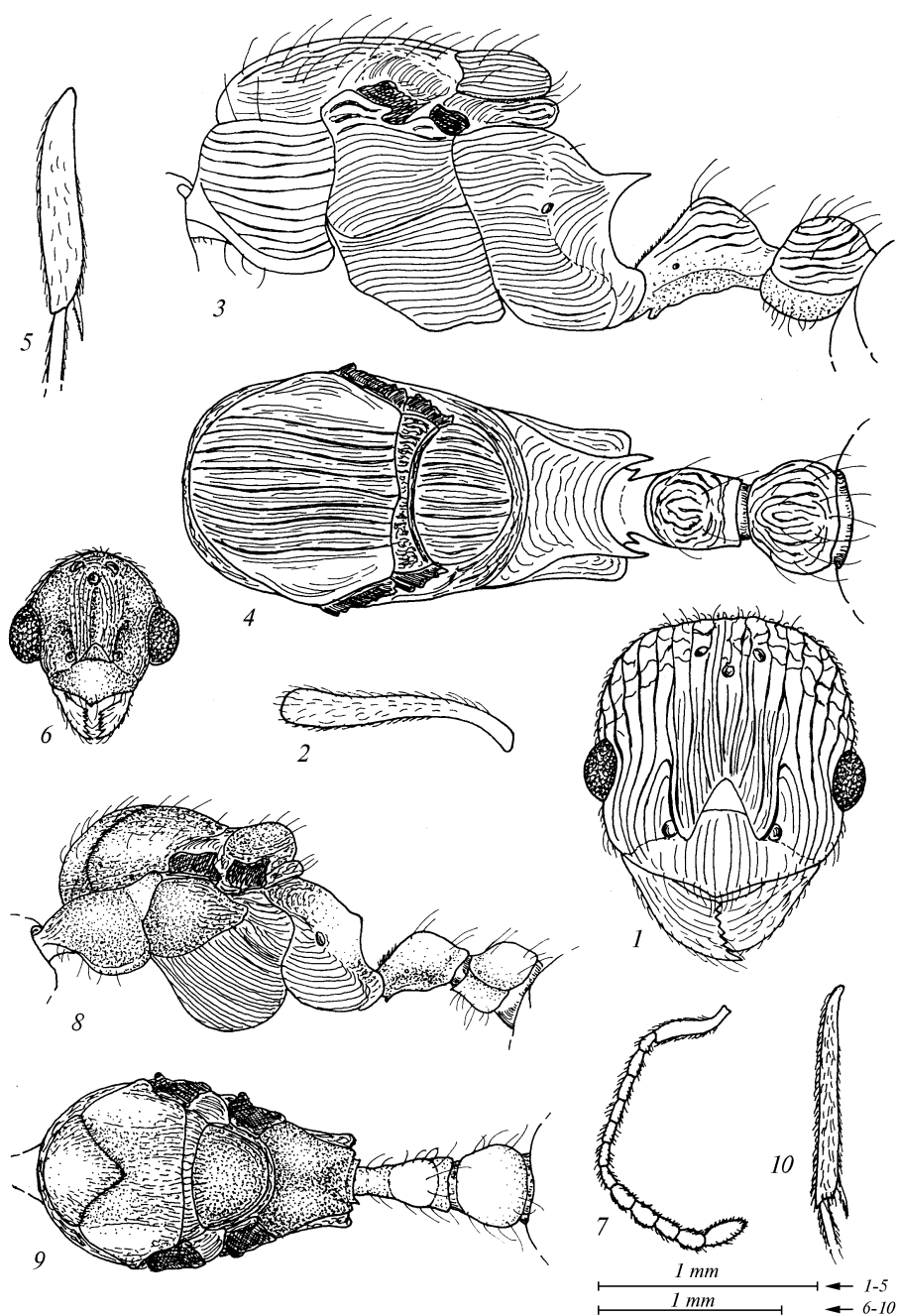


Fig. 5. Details of structure of *Myrmica rupestris* (1-5, queen, 6-10, male): 1, 6 — head, frontal view; 2 — antennal scape; 3, 8 — alitrunk and waist in profile; 4, 9 — alitrunk and waist from above; 5, 10 — hind tibia; 7 — antenna.

Рис. 5. Детали строения *Myrmica rupestris* (1-5, самка, 6-10, самец): 1, 6 — голова спереди; 2 — скапус антенн; 3, 8 — грудь и стебелек в профиль; 4, 9 — грудь и стебелек сверху; 5, 10 — задняя голень; 7 — антенна.

HL 0.72–0.99; HW 0.62–0.87; SL 0.37–0.49; AL 1.61–2.27; HTL 0.99–1.38 mm; CI 1.08–1.20; SI<sub>1</sub> 0.42–0.56; SI<sub>2</sub> 0.50–0.65; PI<sub>1</sub> 1.24–1.61; PI<sub>2</sub> 0.55–0.73; PPI<sub>1</sub> 0.68–0.97; PPI<sub>2</sub> 0.94–1.17; PPI<sub>3</sub> 1.27–1.63; AI 1.52–1.65; SCI 1.12–1.49; HTI 1.39–1.65.

Notes. Queens differ from those of *M. smythiesii* mainly by their larger size, more coarse body sculpture and differently shaped petiole.

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