**Temnothorax kipyatkovi** sp. n. – a new species of ants (Hymenoptera: Formicidae) from India

© Z.M. Yusupov¹, D.A. Dubovikoff², E.B. Lopatina²

¹Tembotov Institute of Ecology of Mountain Territories of the Russian Academy of Sciences, Inessa Armand str., 37a, Nalchik 360051 Russia. E-mail: yzalim@mail.ru
²St Petersburg State University, Universitetskaya emb., 7/9, St Petersburg 199178 Russia. E-mails: dubovikoff@gmail.com, elena.lopatina@gmail.com

**Abstract.** A new ant species, *Temnothorax kipyatkovi* sp. n., is described from India. It is characterized by a head of moderate length, medium length thorax, with weak metanotum impression, propodeum with propodeal spines relatively long, straight, slightly expanded at the base, and obliquely truncate apically; the whole head is coarsely reticulate with longitudinal rugae, the mesosoma has the same sculpture laterally and dorsally; colour of the thorax and pedicel dark brown, head and gaster black-brown, gaster without pale spot at base. A key of workers for all Himalayan species of the genus *Temnothorax* Mayr, 1861 known from India is provided.

**Key words:** Formicidae, ants, *Temnothorax*, taxonomy, new species, identification key, India.

**Temnothorax kipyatkovi** sp. n. – новый вид муравьев (Hymenoptera: Formicidae) из Индии

© З.М. Юсупов¹, Д.А. Дубовиков², Е.Б. Лопатина²

¹Институт экологии горных территорий РАН им. А.К. Темботова, ул. Иннесса Арманд, 37а, Нальчик 360051 Россия. E-mail: yzalim@mail.ru
²Санкт-Петербургский государственный университет, Университетская наб., 7/9, Санкт-Петербург 199178 Россия. E-mails: dubovikoff@gmail.com, elena.lopatina@gmail.com

**Резюме.** Новый вид муравьев *Temnothorax kipyatkovi* sp. n. описан из Индии. Вид характеризуется следующими признаками: голова умеренной длины, грудь средней длины со слабым метанотальным вдавлением, проподеум с относительно длинными, прямыми, слабо расширенными в основании зубцами, которые выглядят косо срезанными на концах; вся голова в грубых сетчатых и продольных морщинках, грудь с боков и сверху с такими же грубыми продольными и сетчатыми морщинками; цвет груди и стебелька темно-коричневый, голова и брюшко черно-коричневые, брюшко без светлого пятна у основания. Приведена определительная таблица по рабочим для всех гималайских видов рода *Temnothorax* Mayr, 1861, известных из Индии.

**Ключевые слова:** Formicidae, муравьи, *Temnothorax*, систематика, новый вид, определитель, Индия.

**Introduction**

One of the largest ant genera globally is *Temnothorax* Mayr, 1861, which comprises 414 species and 37 subspecies, including 280 taxa in the Palearctic region [Bolton, 2020]. The greatest diversity of the genus in this region is shared between the Mediterranean, the Caucasus, mountains of Central Asia, and Eastern Asia [Borowiec, 2014; Csősz et al., 2015, 2018; Salata, Borowiec, 2015; Galkowski, Lebas, 2016; Galkowski, Cagniant, 2017; Catarineu et al., 2017; Sharaf et al., 2017; Salata et al., 2018; Salata, Borowiec, 2019]. The fauna of *Temnothorax* of the Himalayan region is very poorly studied and currently only 11 species and one subspecies of this genus are known there [Bharti et al., 2012, 2016a, b; Rasheed et al., 2020]. We describe here an additional new species from the Indian Himalayas.

**Material and methods**

The material was collected during an expedition organized by the Center for Himalayan Scientific Research of the Saint Petersburg Union of Scientists in 2019, in the Uttarakhand State, India. The main sampling method used to collect ants was hand collection targeting nests.

A Leica M205C stereo microscope was used for morphological analysis and measurements. The photographs were taken using scanning electronic microscopes Hitachi TM3000 and Quanta 200 3D. All measurements are in millimeters (accurate to 0.01 mm) and follow standard measurements of Rasheed et al. [2020] with changes.

The type material is deposited in the Zoological Institute of the Russian Academy of Sciences (ZISP, St Petersburg, Russia).

**Measurements:**

- **HL** – maximum length of the head in dorsal view, measured in a straight line from the most anterior point of clypeus to the mid-point of occipital margin;
- **HW** – maximum width of the head in dorsal view behind (above) the eyes;
- **SL** – maximum straight-line length of the scape from its apex to the articulation with condylar bulb;
- **OL** – maximum length of the eye;
- **FW** – minimal width of the frons between the frontal carinæ;
- **FLW** – maximum distance between the outer borders of the frontal lobes;
- **AL** – diagonal length of the mesosoma (seen in profile) from the anterior end of the neck shield to the posterior margin of the propodeal lobes.

**Measurements:**

- **AL** – diagonal length of the mesosoma (seen in profile) from the anterior end of the neck shield to the posterior margin of the propodeal lobes.

**Formicidae, муравьи, *Temnothorax*, систематика, новый вид, определитель, Индия.**
AH – measured in profile from the imaginary line connecting uppermost points of promesonotum and propodeum perpendicularly to the lowermost point of mesopleuron;

PNW – maximum width of the pronotum in dorsal view;

PL – maximum length of the petiole in dorsal view, measured from the posterodorsal margin of petiole to the articulation with propodeum (just below the posterior visible margin of propodeum); the petiole should be positioned so that measured points lay on the same plane;

PW – maximum width of the petiole in dorsal view;

PH – maximum height of petiole in profile, measured from the uppermost point of the petiolar node perpendicularly to the imaginary line between the anterocentral (just behind the subpetiolar process) and posteroventral points of petiole;

PPL – maximum length of postpetiole in dorsal view between its visible anterior and posterior margins;

PPW – maximum width of the postpetiole in dorsal view;

PPH – maximum height of the postpetiole in profile from the uppermost to the lowermost point, measured perpendicularly to the tergo-sternal suture;

ESL – length of propodeal spine, measured in lateral view from its tip to the center of propodeal stigma;

ESD – distance between the tips of propodeal spine in dorsal view;

SCW – maximum width of scutum in dorsal view (queens and males);

SCL – length of scutum + scutellum in dorsal view (queens and males);

Indices: CI (cephalic index) – HL/HW; FLI (frontal lobe index) – FL/FW; S11 (shape index 1) – SL/HL; S12 (shape index 2) – SL/HW; O11 (ocular index 1) – OL/HL; O12 (ocular index 2) – OL/HW; PI (petiolar index) – PL/PW; PPL/PPH; ESLI (propleural spine length index) – ESL/ESD; ESDI (propleural spine-distance index) – ESL/ESD; AI (mesosomal index) – AL/AH; SCI (scutum index) – SCL/SCW.

**Temnothorax kipyatktovi**

Z.M. Yusupov, Dubovikoff et Lopatina, sp. n. (Figs 1–6)

**Material.** Holotype, worker (ZISP): India, Uttarakhand, road to the lake Nachiketa Tal, 30°38'N / 78°28'E, 2200–2400 m a.s.l., 11.05.2019 (E.B. Lopatina). Paratypes: 52 workers, 3 queens (ZISP), same data as in holotype.

**Description.** Workers. Head longer than broad, with weakly convex sides, feebly convex occipital margin and widely rounded occipital corners. Anterior clypeal margin convex, gradually rounded, without a medial notch. Eyes rather big, equal to length of genae, situated approximately at midlength of sides of head. Frontal lobes little extended, so that distance between their outer margins slightly more than to width of frons. Scape relatively long, reaching or slightly surpassing the posterior margin of head when fully retracted. Masticatory margin of mandibles with 5 teeth, apical and preapical ones are the largest.

Mesosoma of moderate length, with a shallow metanotal groove, its dorsum convex, promesonotal suture developed (seen from above). Propodeum with spines that are relatively long, straight, slightly widened at the base, their tips are obliquely truncate. Petiole quite high, with distinct, very long peduncle, its anterior surface concave, petiolar node distinct, with well-developed horizontal or somewhat posteriorly inclined dorsal plane. Postpetiole subglobular, slightly longer than height.

Whole head dorsum reticulately rugulose and with sinuous longitudinal rugae. Seen in profile, genae with large reticulate rugae, temples with reduced sculpture and rare rugae, appearing shiny. Clypeus with central and several lateral longitudinal carinae, surface of clypeus smooth and shiny. Mandibles with fine superficial striation.

Whole mesosoma and waist with sinuous longitudinal rugae and reticulately rugulose. Mesopleurae, sides on propodeum and waist with smaller reticulate rugae, rest surface of mesosoma with reticulate rugae of different sizes. Gaster smooth and shiny.

Whole body with numerous straight, moderately long and blunt standing hairs, legs with fine decumbent pubescence, scape with abundant short subdecumbent pilosity. Mesosoma and waist dark brown, head blackish-brown, appendages and mandibles yellowish-brown. First gaster tergite completely blackish-brown, without lighter spot at the base.

Queens. Head about as in the workers, but wider. Scape shorter than in workers and slightly not reaching the posterior margin of head. Mesosoma relatively long and low, propodeal spines relatively long. Petiole about as in the workers. Sculpture of head dorsum the same in the workers. Pronotum, mesopleurae and propodeum with sinuous longitudinal and reticulate rugae, scutum with sinuous longitudinal rugulosity, scutellum in the upper part rugulose, rest smooth, petiole and postpetiole reticulate and sinuously longitudinally rugulose. The body surface appears shiny.

Colour of body about as in the workers. Measurements: workers (n = 20), ordered as holotype (min–max) [mean]: HL 0.7 (0.6–0.7) [0.66], HW 0.57 (0.49–0.58) [0.54], SL 0.56 (0.47–0.56) [0.52], OL 0.15 (0.12–0.15) [0.14], FW 0.19 (0.16–0.2) [0.18], FL 0.21 (0.17–0.22) [0.2], AL 0.93 (0.78–0.93) [0.87], AH 0.4 (0.33–0.42) [0.37], PPH 0.16 (0.14–0.16) [0.16], PH 0.21 (0.19–0.21) [0.21], PPL 0.23 (0.21–0.23) [0.22], PPH 0.26 (0.22–0.26) [0.24], PDI 0.22 (0.19–0.22) [0.21], ESL 0.19 (0.15–0.19) [0.17], ESD 0.22 (0.18–0.23) [0.21].

Indices: CI 1.12 (1.18–1.25) [1.22], S1 0.8 (0.77–0.82) [0.8], S2 0.97 (0.94–1.01) [0.97], FLI 1.11 (1.1–1.12) [1.12], OLI 0.22 (0.19–0.23) [0.22], OLI 0.26 (0.24–0.28) [0.26], PI 1.53 (1.3–1.53) [1.42], PPI 1.06 (1.06–1.14) [1.08], ESLI 0.34 (0.29–0.35) [0.32], ESDI 1.14 (1.12–1.36) [1.12], AI 2.31 (2.17–2.52) [2.35].

Queens (n = 2): HL 0.76 (0.75), HW 0.68 (0.68), SL 0.58 (0.58), OL 0.23 (0.22), FW 0.25 (0.23), FL 0.26 (0.25), AL 1.3 (1.32), AH 0.74 (0.77), SCW 0.72 (0.75), SCI 0.98 (0.98), PI 0.37 (0.37), PW 0.25 (0.23), PH 0.29 (0.28), PPI 0.35 (0.35), PPH 0.36 (0.36), PPL 0.32 (0.3), ESL 0.26 (0.23), ESD 0.35 (0.33).

Indices: CI 1.11 (1.10), S1 0.77 (0.76), SI 0.85 (0.84), FL 1.05 (1.05), OLI 0.31 (0.29), OLI 0.34 (0.32), PI 1.28 (1.32), PII 0.36 (0.28), ESL 0.38 (0.34), ESD 0.31 (0.31), SCI 1.34 (1.29).

Male unknown.

**Comparative diagnosis.** Temnothorax kipyatktovi sp. n. differs from all Himalayan species of the genus by the long, straight and apically obliquely truncate propodeal spines (ESLI mean 0.32) and the rough reticulate sculpture of the head and thorax. This new species is close to T. kashmirensis Bharti, Gul et Schulz, 2012 and T. rothenyi (Forel, 1902), but clearly differs from the first species by the uniformly dark brown colour and completely rugulose head, and from the latter by its very weak metanotal groove,
long antennal scape, head and mesosoma sculpture, and colouration.

**Bionomics.** Specimens were collected in rhododendron-oak forest (Quercus leucotrichophora A. Camus and Rhododendron arboreum Sm.), on the road along the edge of the cliff. Nests in the soil, under rocks.

**Distribution.** India: North-West Himalaya, Uttarakhand.

**Etymology.** The species is named after our teacher and friend Vladilen Yevgenyevich Kipyatkov, a Professor at Saint Petersburg University who died prematurely.

**A revised key to the known Himalayan species of Temnothorax from India based on worker caste**
(modified after Bharti et al. [2016b])

1. Propodeum without any teeth or spines; pilosity very sparse; head and mesosoma shiny, very slightly longitudinally rugose, rest of the body smooth and shine ............................................... *T. inermis* (Forel, 1902)
   – Propodeum with variously developed teeth or spines; pilosity more dense; head and mesosoma smooth or
with different surface sculpture but never with only slightly longitudinally rugose sculpture

2. Dorsal outline of mesosoma in profile without any impression, mesometanotal groove absent ................. 3
   – Dorsal outline of mesosoma in profile more or less impressed at the mesometanotal groove or behind ... 4

3. Mesosoma, the base of the first gastral segment, petiole, postpetiole, legs and antennae testaceous yellow to yellowish brown; head and rest of gaster brown; CI = 122–124; SI1 = 75–78.6 ................................................. T. desoi (Menozzi, 1939)
   – The colour is uniformly brown; CI = 127–128; SI1 = 73–75 ....................................................... T. desoi melancholic (Menozzi, 1939)

4. Either head and mesosoma distinctly sculptured or the head is smooth and mesosoma distinctly sculptured ...
   – Head and mesosoma smooth and shining with a few rugae .......................................................... 5

5. Head smooth, mesosoma distinctly sculptured; the species is bicoloured, with light to dark brown head and gaster and yellowish to reddish yellow mesosoma .......................... T. kashmiresis Bharti, Gul et Schulz, 2012

Propodeal spines much longer, as long as 2/3 the range

6. Whole body black or blackish brown; head and mesosoma with coarse longitudinal and reticulate rugosity ... 7

7. Propodeal spines short, strong widened and triangular; ESL1 = 18–23; scape short, SI1 = 72–73; SI2 = 85–90 ...
   – Propodeal spines long, slightly widened and straight; ESL1 = 29–35; scape long, SI1 = 77–82; SI2 = 94–101 

Acknowledgements

We thank to Alexander Radchenko (I.I. Schmalhausen Institute of Zoology of the Academy of Sciences of Ukraine, Kiev) and two anonymous referees for review and valuable suggestions for the improvement of this manuscript.

The authors are sincerely grateful to the Center for Himalayan Scientific Research of the St Petersburg Union of Scientists for the excellent organization of the expedition research. The photographs and morphological investigations were taken using the equipment of the Science Park of St Petersburg State University (Resource Center “Microscopy and Microanalysis”, project No 112-11405). The study was carried out as part of the basic research program of the St Petersburg State University (for D.A. Dubovikoff and E.B. Lopatina) and partially supported by a grant from St Petersburg State University “Urbanized ecosystems of the Arctic zone of the Russian Federation: dynamics, state and sustainable development” (No 28612627) (for D.A. Dubovikoff) and RFBR No 18-04-00961 (for Z.M. Yusupov).

References


Salata S., Borowiec L. 2015. Description of Temnothorax antiquus (Försell, 1911) and description of its new social parasite Temnothorax carthusiense sp. n. from Turkey (Hymenoptera, Formicidae). ZooKeys. 523: 129–148. DOI: 10.3897/zookeys.523.6103


*Temnothorax kipyatkovi* sp. n. – a new species of ants (Hymenoptera: Formicidae) from India

Received / Поступила: 11.10.2020
Accepted / Принята: 7.12.2020
Published online / Опубликована онлайн: 22.12.2020