

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

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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 metanotal 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

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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; Csósz 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 carinae;

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;

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 anteroventral (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) – FLW/FW; SI1 (scape index 1) – SL/HL; SI2 (scape index 2) – SL/HW; OI1 (ocular index 1) – OL/HL; OI2 (ocular index 2) – OL/HW; PI (petiolar index) – PL/PH; PPI (postpetiolar index) – PPL/PPH; ESLI (propodeal spine length index) – ESL/HW; ESDI (propodeal spine-distance index) – ESD/ESL; AI (mesosomal index) – AL/AH; SCI (scutum index) – SCL/SCW.

Temnothorax kipyatkovi

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 gastral tergite completely blackish-brown, without lighter spot at the base.

Queens. Head about as in the workers, but wider. Scape shorter than as 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], FLW 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], PNW 0.40 (0.35–0.42) [0.38], PL 0.32 (0.26–0.32) [0.29], PW 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], PPW 0.26 (0.22–0.26) [0.24], PPH 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 1.22 (1.18–1.25) [1.22], SI1 0.8 (0.77–0.82) [0.8], SI2 0.97 (0.94–1.01) [0.97], FLI 1.11 (1–1.2) [1.12], OI1 0.22 (0.19–0.23) [0.22], OI2 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) [1.22], AI 2.31 (2.17–2.52) [2.35].

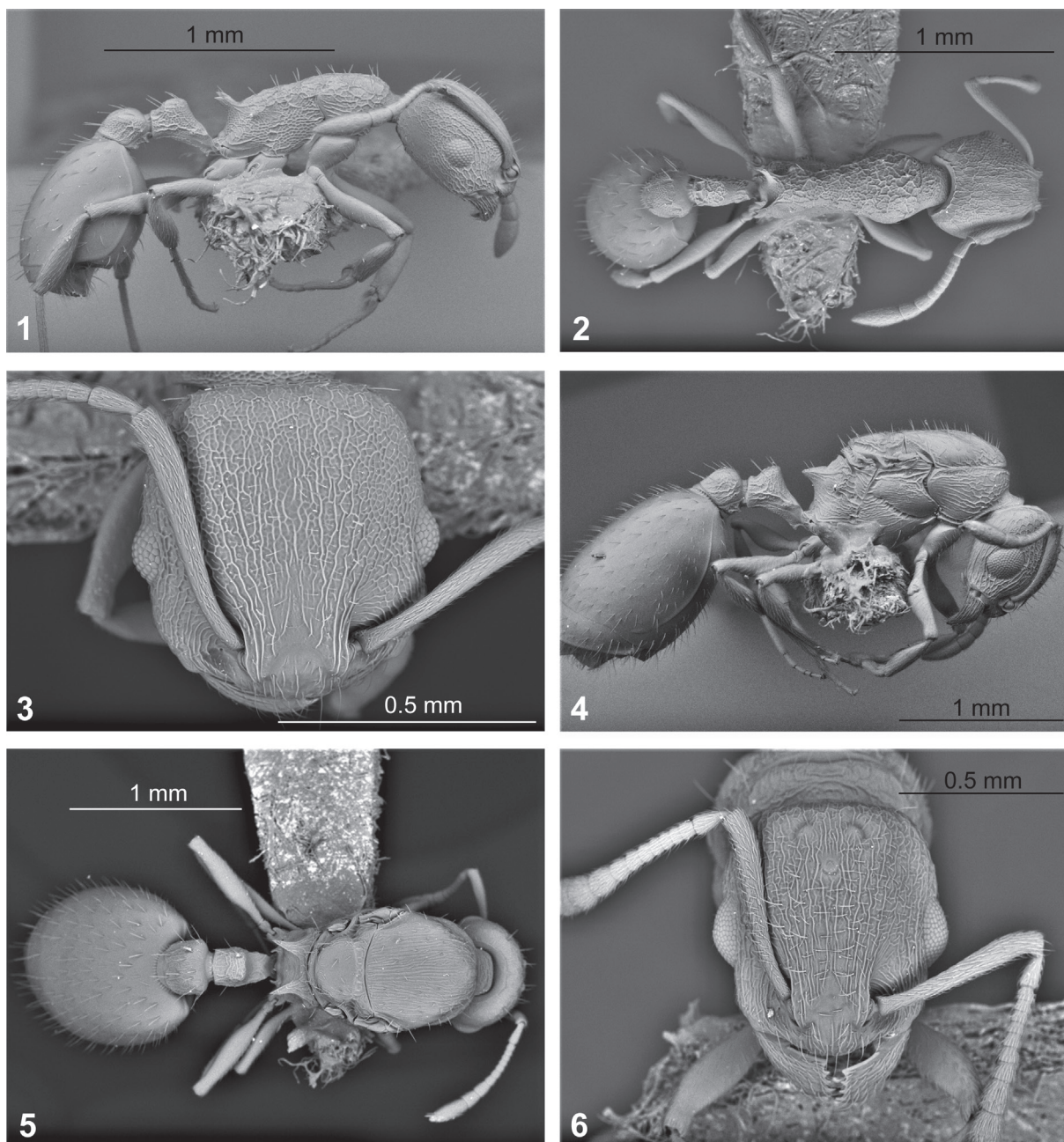
Queens ($n = 2$): HL 0.76 (0.75), HW 0.68 (0.68), SL 0.58 (0.58), OL 0.23 (0.22), FW 0.25 (0.23), FLW 0.26 (0.25), AL 1.3 (1.32), AH 0.74 (0.77), SCW 0.72 (0.75), SCL 0.98 (0.98), PL 0.37 (0.37), PW 0.25 (0.23), PH 0.29 (0.28), PPL 0.35 (0.35), PPW 0.36 (0.36), PPH 0.32 (0.3), ESL 0.26 (0.23), ESD 0.35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

Indices: CI 1.11 (1.10), SI1 0.77 (0.76), SI2 0.85 (0.84), FLI 1.05 (1.05), OI1 0.31 (0.29), OI2 0.34 (0.32), PI 1.28 (1.32), PPI 1.08 (1.13), ESLI 0.38 (0.34), ESDI 1.31 (1.41), AI 1.75 (1.71), SCI 1.34 (1.29).

Male unknown.

Comparative diagnosis. *Temnothorax*

kipyatkovi **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. rothneyi* (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,



Figs 1–6. *Temnothorax kipyatkovi* sp. n.

1–3 – worker, holotype; 4–6 – queen, paratype. 1, 4 – lateral view; 2, 5 – dorsal view; 3, 6 – head.

Рис. 1–6. *Temnothorax kipyatkovi* sp. n.

1–3 – рабочий, голотип; 4–6 – царица, паратип; 1, 4 – вид сбоку; 2, 5 – вид сверху; 3, 6 – голова.

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
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. desioi* (Menozzi, 1939)
- The colour is uniformly brown; CI = 127–128; SI1 = 73–75
..... *T. desioi melanicus* (Menozzi, 1939)
4. Either head and mesosoma distinctly sculptured or the head is smooth and mesosoma distinctly sculptured 5
- Head and mesosoma smooth and shining with a few rugae 11
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. kashmirensis* Bharti, Gul et Schulz, 2012
- Head and thorax distinctly sculptured; colour combination different but never as in above 6
6. Whole body black or blackish brown; head and mesosoma with coarse longitudinal and reticulate rugulosity 7
- Whole body light yellow to dark brown, never black; head distinctly rugulose and microreticulated 8
7. Propodeal spines short, strong widened and triangular; ESLI = 18–23; scape short, SI1 = 72–73; SI2 = 85–90 ...
..... *T. schurri* (Forel, 1902)
- Propodeal spines long, slightly widened and straight; ESLI = 29–35; scape long, SI1 = 77–82; SI2 = 94–101
..... *T. kipyatkovi* sp. n.
8. The colour of head distinctly brown 9
- The colour of head distinctly yellow 10
9. Propodeal spines longer, straight, their tips are obliquely cut; ESLI = 11–20
..... *T. rothneyi* (Forel, 1902)
- Propodeal spines shorter, triangular, more or less dentate; ESLI = 9–10
..... *T. simlensis* (Forel, 1904)
10. Head and mesosoma with microreticulate sculpture; whole body is light to dark yellow with a reddish tinge except for the middle tergites gaster which are brown
..... *T. microreticulatus* Bharti, Gul et Schulz, 2012
11. Propodeal spines very short, appearing as two small blunt denticles (tubercles) in dorsal view; node of petiole rounded in profile
..... *T. wroughtonii* (Forel, 1902)
- Propodeal spines much longer, as long as 2/3 the range of their bases; node of petiole more or less angular in profile 12
12. Head more or less chestnut brown; mesosoma, legs, antennae, petiole and postpetiole more or less yellowish brown; gaster dark brown; CI = 120–139; SI1 = 77–79; SI2 = 94–108
..... *T. fultonii* (Forel, 1902)
- Head light yellow to dark yellow with a brownish tinge; mesosoma light to dark yellow; gaster light yellow to dark yellow most often with a brownish patch dorsally in the middle; CI = 113–122; SI1 = 70–76; SI2 = 81–95
..... *T. himachalensis* Bharti, Gul et Schulz, 2012

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References

- Bharti H., Guenard B., Bharti M., Economo E.P. 2016a. An updated checklist of the ants of India with their specific distributions in Indian states (Hymenoptera: Formicidae). *ZooKeys*. 551: 1–83. DOI: 10.3897/zookeys.551.6767
- Bharti H., Gul I., Sasi S. 2016b. Taxonomy of *Temnothorax simlensis* stat. nov. (Hymenoptera: Formicidae) with first description of sexual castes along with a mention of its plesio-biotic association with Himalayan species of genus *Myrmica*. *Sociobiology*. 63(2): 748–754. DOI: 10.13102/sociobiology.v63i2.869.
- Bharti H., Gul I., Schulz A. 2012. Three new species of genus *Temnothorax* (Hymenoptera: Formicidae) from Indian Himalayas with a revised key to the Indian species. *Acta Zoologica Academiae Scientiarum Hungaricae*. 58(4): 325–336.
- Bolton B. 2020. An online catalog of the ants of the world. Version 5.21. Available at: <https://antcat.org> (accessed 1 May 2020).
- Borowiec L. 2014. Catalogue of ants of Europe, the Mediterranean Basin and adjacent regions (Hymenoptera: Formicidae). *Genus*. 25: 1–340.
- Catarineu C., Barbera G.G., Reyes-Lopez J.L. 2017. A new ant species, *Temnothorax ansei* sp. n. (Hymenoptera: Formicidae) from the Arid Environments of South-eastern Spain. *Sociobiology*. 64(2): 138–145. DOI: 10.13102/sociobiology.v64i2.1274
- Csász S., Heinze J., Miko I. 2015. Taxonomic Synopsis of the Ponto-Mediterranean Ants of *Temnothorax nylanderii* species-group. *PLoS ONE*. 10(11): e0140000. DOI: 10.1371/journal.pone.0140000
- Csász S., Salata S., Borowiec L. 2018. Three Turano-European species of the *Temnothorax interruptus* group (Hymenoptera: Formicidae) demonstrated by quantitative morphology. *Myrmecological News*. 26: 101–119.
- Galkowski C., Cagniant H. 2017. Contribution a la connaissance des fourmis du groupe *angustulus* dans le genre *Temnothorax* (Hymenoptera, Formicidae). *Revue de l'Association Roussillonnaise d'Entomologie*. 26(4): 180–191.
- Galkowski C., Lebas C. 2016. *Temnothorax conatensis* nov. sp., décrite des Pyrénées-Orientales (France) (Hymenoptera, Formicidae). *Revue de l'Association Roussillonnaise d'Entomologie*. 25(2): 80–87.
- Rasheed M.T., Bodlah I., Yusupov Z.M., Faren A.G., Bodlah M.A., Prebus M., Wachkoo A.A. 2020. Preliminary contributions toward a revision of the ant genus *Temnothorax* Mayr (Hymenoptera: Formicidae) from Pakistan. *Turkish Journal of Zoology*. 44: 375–381. DOI: 10.3906/zoo-2003-54
- Salata S., Borowiec L. 2015. Redescription of *Temnothorax antigoni* (Forel, 1911) and description of its new social parasite *Temnothorax curtisetosus* sp. n. from Turkey (Hymenoptera, Formicidae). *ZooKeys*. 523: 129–148. DOI: 10.3897/zookeys.523.6103
- Salata S., Borowiec L. 2019. Preliminary division of not socially parasitic Greek *Temnothorax* Mayr, 1861 (Hymenoptera, Formicidae) with a description of three new species. *ZooKeys*. 877: 81–131. DOI: 10.3897/zookeys.877.36320

Salata S., Borowiec L., Trichas A. 2018. Taxonomic revision of the Cretan fauna of the genus *Temnothorax* Mayr, 1861 (Hymenoptera: Formicidae), with notes on the endemism of ant fauna of Crete. *Annales Zoologici*. 68(4): 769–808. DOI: 10.3161/00034541ANZ2018.68.4.004

Sharaf M.R., Akbar S.A., Al Dhafer H.M., Gharbawy A., Aldawood S.A. 2017. Taxonomy of the Myrmicine ant genus *Temnothorax* Mayr, 1861 (Formicidae: Myrmicinae) in the Arabian Peninsula. *European Journal of Taxonomy*. 280: 1–17. DOI: 10.5852/ejt.2017.280

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