

## *Lasius elevatus*, a new ant species of the subgenus *Cautolasius* (Hymenoptera: Formicidae) from the Indian Himalayas

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**ABSTRACT.** A new species of the formicine ant genus *Lasius*, viz *Lasius elevatus* sp. nov., is described from the Indian Himalayas. This is the third species of the subgenus *Cautolasius* known from the Himalayas, with *L. alienoflavus* Bingham, 1903 and *L. talpa* Wilson, 1955 reported earlier. A key is provided for the 13 species reported from this region.

**Keywords:** *Lasius*, *Cautolasius*, Formicinae, taxonomy, new species, key, Indian Himalaya.

### INTRODUCTION

The genus *Lasius* Fabricius is currently represented by 102 extant species/subspecies and 23 fossil species/subspecies from the world (Bolton 2012). From the different ranges of the Himalayas 16 species have been reported so far, including 12 species from the Indian Himalayas (Bharti 2008). A monographic revision of *Lasius* was done by Wilson (1955). He separated the *flavus*-complex, i.e. *L. flavus* (Fabricius), *L. nearcticus* Wheeler, *L. alienoflavus* Bingham, *L. talpa* Wilson and *L. fallax* Wilson, as a distinct subgenus *Cautolasius*, and provided a key for the Palaearctic. Seifert (1992) revised the subgenus *Lasius sensu stricto* from the Palaearctic, describing 17 species as new, and provided a new key for the Palaearctic. Other significant contributions to the genus include: Bingham (1903: India species key); Menozzi (1939: Himalayas and Tibet species key); Collingwood (1982: Himalayan species key); Kupyanskaya (1989: East Palaearctic *Lasius* (*Dendrolasius*) species key); and Radchenko (2005: East Palaearctic *Lasius* (*Dendrolasius*) species key).

Here we present a description of a new species, *Lasius elevatus* sp. nov., based on the worker caste, collected from the North-West range of the Indian Himalayas. This brings the number of *Lasius* species in the Indian Himalayas

to 13. The collected material represents two populations, with slight morphometric variation which is well within the intraspecific variation of *Cautolasius*. One population, collected separately, was found to be consistently larger than the other. Considering the similar habitat and high intraspecific variation in *Cautolasius*, we interpret this as intraspecific variation, although the possibility of heterospecificity remains. Investigation of sexuals or analyses of nuclear DNA may help to clear up the situation.

### MATERIALS AND METHODS

The specimens were collected by hand-picking. The taxonomic analysis was carried out on a Nikon SMZ 1500 stereo zoom microscope. For digital images, an Evolution MP digital camera was used on the same microscope with Auto-Montage (Syncroscopy, a division of Synoptics, Ltd.) software. Later, images were cleaned as per requirements with Adobe Photoshop CS5. Holotype and paratypes have been deposited in the Punjabi University Patiala Ant Collection, Patiala (PUPAC). Measurements were recorded in micrometres between 120 x and 225 x, with a measuring accuracy of  $\pm 1 \mu\text{m}$  for small measurements like eye length, of  $\pm 2 \mu\text{m}$  for medium-sized measurements like head width, and of  $\pm 6 \mu\text{m}$  for larger measures like

mesosomal length. The basic morphometric data are presented in Table 1. Morphological terminology for measurements and indices (given in micrometres) includes:

- HL Head length: The length of the head capsule, excluding the mandibles, measured in full-face view in a straight line from the middle of the anterior clypeal margin to the middle of the occipital margin. The head has to be carefully tilted to the position with the maximum length.
- HW Head width: Maximum measurable head width; this is either across eyes or the head capsule width behind the eyes, seen in transmitted light to measure the real cuticular surface and not the pubescence surface.
- SL Scape length: The maximum straight-line length of the scape, excluding the basal constriction or neck that occurs just distal to the condylar bulb.
- EL Eye length: The largest diameter of the eye across all structurally-visible ommatidia, irrespective of the pigmentation status.
- EW Eye width: The smaller diameter of the eye, measured perpendicular to the dimension of the EL and across structurally defined ommatidia.
- ML Mesosomal length: The length of the mesosoma in profile, from the neck shield to the posterior margin of propodeal lobes.
- HS Number of standing hairs projecting > 20  $\mu\text{m}$  from dorsal profile of scape, i.e. the number of hairs visible when looking at the small diameter of scape under transmitted-light conditions. The always-present hairs on the distal apex are not counted and the number refers to one scape.
- HHT Number of standing hairs projecting > 20  $\mu\text{m}$  from extensor profile of one hind tibia seen in transmitted light. The always-present hairs on distal apex are not counted and the number refers to one tibia.

PDCL Average pubescence distance on clypeus. The number  $n$  of pubescence hairs crossing or touching a measuring line of length  $l$  is counted. PDCL is then  $l/n$  and given in  $\mu\text{m}$  (arrow in Fig. 2, Seifert 1992).

UHL Length of longest standing-hair on underside of head.

PNHL Length of longest standing-hair on pronotum.

CI - Cephalic index:  $HL/HW \times 100$

EI - Eye index:  $EL/HW \times 100$

$SI_1$  - Scape index 1:  $SL/HL \times 100$

$SI_2$  - Scape index 2:  $SL/HW \times 100$

HS - Head size:  $HL + HW/2$

**Table 1.** Morphometric data of the new species showing arithmetic mean and standard deviation; minimum and maximum values are in brackets. The number below the species name gives the number of measured specimens.

<i>L. elevatus</i>	
(n = 35)	
HL	777.142 $\pm$ 34.177 [730, 850]
HW	703.149 $\pm$ 36.684 [670, 800]
SL	592.0 $\pm$ 28.574 [550, 660]
EL	74.743 $\pm$ 9.799 [66, 90]
EW	55.543 $\pm$ 6.723 [48, 72]
ML	855.714 $\pm$ 54.410 [780, 970]
CI	110.579 $\pm$ 1.972 [107.69, 113.04]
EI	10.60 $\pm$ 0.939 [9.56, 12.33]
$SI_1$	176.178 $\pm$ 2.801 [72.29, 78.57]
$SI_2$	284.252 $\pm$ 2.801 [78.20, 88.23]
HS	740.143 $\pm$ 34.905 [700, 820]

## SPECIES ACCOUNT

### *Lasius elevatus* sp. nov. (Figs. 1 – 6):

**Material examined.** Holotype worker: India, Himachal Pradesh, Bharmour, 32.4428N, 76.5479E, 1845m above m.s.l., 03.vii.2010 (coll. Irfan Gul). Paratypes: 10 workers, same data as holotype; 15 workers India, Himachal Pradesh, Naggar, 32°07'N, 77°10'E, 1700m, 26.vi.2010;

9 workers Manali, 32.2310N, 77.1910E, 1845m above m.s.l., 17.vi.2010. hand picking (coll. Irfan Gul).

**Description of worker.** Morphometric data of the holotype: HL 750; HW 690; SL 560; EL 66;

EW 54; ML 800; HS 720; CI 108.69; EI 9.56; SI<sub>1</sub> 74.67; SI<sub>2</sub> 81.16

**Head:** Head roughly rectangular in full-face view (CI 107.69-113.04); occipital margin flat; occipital corners round; a few occipital setae present (longest 78  $\mu$ m) but not reaching to hind margin of eyes; lateral sides of head more-or-less parallel, somewhat narrowing anteriorly; anterior clypeal margin broadly convex, clypeal carina variable but on average less clearly developed; lateral clypeal profile convex; eyes almost round, size rather intermediate between that of *Lasius alienoflavus* Bingham and *Lasius talpa* Wilson (EI 9.56-12.33); mandibles triangular, the masticatory margin with 7 to 8 teeth, including denticles; antennae 12-segmented, scape reaching distinctly to the occipital margin.

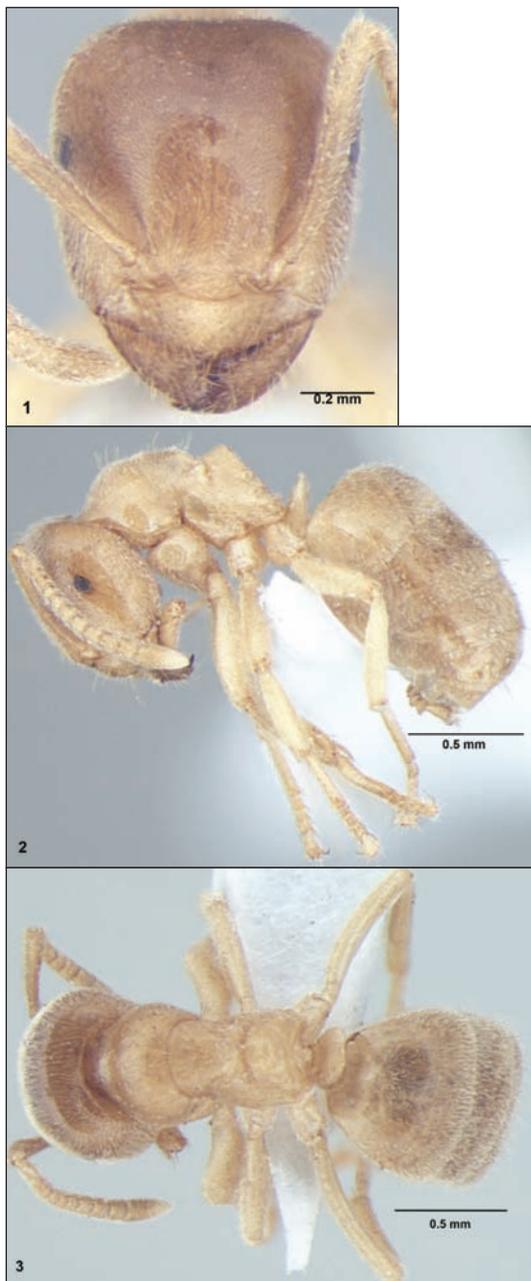
**Mesosoma, Petiole and Gaster:** Mesosoma with weakly convex promesonotal dorsum; propodeal dome more conic than hemispheric, as high as mesonotum; area between propodeal spiracle and metapleural gland without setae; in frontal view petiole node with feebly convex sides, narrowing towards the crest and weakly convex to feebly emarginate dorsal crest, in profile with straight or slightly convex anterior face and straight posterior face; gaster more-or-less ovate.

**Sculpture and pilosity:** In general body smooth and fairly shining with scattered pilosity; head and mesosoma with shallow micropunctures; body covered with suberect to erect setae, more abundant and longest on gaster (140  $\mu$ m); cuticular surface covered with smooth and rather dense pubescence; gena without standing hairs or setae; scape with subdecumbent to decumbent pubescence, a few setae present at the proximal end; hind tibia pubescence smooth, setae are normally present at the proximal end.

**Colour:** The species is light to dark yellow in colour; the masticatory margin is dark brownish and the eyes are black; pubescence pale-yellow.

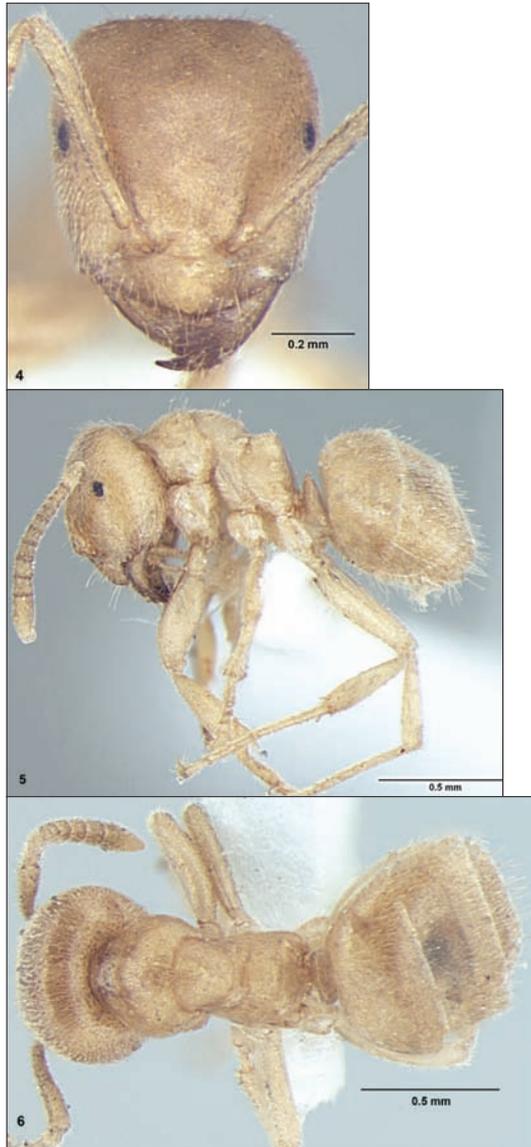
**Etymology.** The species is named for its high-altitude habitat.

**Distribution and habitat.** The species has been collected from the North-West range of the Indian Himalayas, in Himachal Pradesh. The specimens



**Figs. 1 – 3.** *Lasius elevatus* sp. nov. (Large worker), worker (1) Head, dorsal view; (2) Body, lateral view; (3) Body, dorsal view.

were collected from soil and under stones by hand-picking. In Manali the area was forested, beside a river with a good amount of moisture in the soil. It was a dense pine forest with little undergrowth. The nest was a few inches deep. The other two localities were also forested areas with scarce undergrowth; the collection at these was on a hill slope mostly covered by grasses.



**Figs. 4 – 6.** *Lasius elevatus* sp. nov. (Small worker), worker (4) Head, dorsal view; (5) Body, lateral view; (6) Body, dorsal view.

**Comparative notes.** *Lasius elevatus* sp. nov. is significantly different from previously reported species of this genus due to the following combination of characters: unique size of eyes, structure of petiole, head length, head width, scape length (Table 1) and pilosity of the body. It most resembles *L. talpa* Wilson, and comes somewhat close to *L. alienoflavus* Bingham. It can be easily differentiated from the former as in *L. talpa* the setae are very dense and are distributed all over the body including scapes, tibiae and genal margins (Wilson 1955), while in *L. elevatus* the setae are more sparse and absent on the genal margins. In *L. alienoflavus*, the dorsal crest of the petiole is flat (relatively convex in *L. elevatus*), the eyes are much larger (EL > 120  $\mu$ m, cf. EL < 90  $\mu$ m in *elevatus*), and EW, SL, HL and HW are all greater than in *elevatus*. Within the *Cautolasius* subgenus it can be separated from the widely-distributed *Lasius flavus* (Fabricius) by the size of the apical and penultimate segments of the maxillary palps. In *L. elevatus* the preapical segment is shorter than the apical segment (Apical VI 60-73  $\mu$ m; Preapical V 40-52  $\mu$ m) but in *L. flavus* the preapical segment is larger than or equal in size to the apical segment (Wilson 1955).

**Key to the known species of *Lasius* from the Indian Himalayas based on the worker caste**

1. Eyes small, eye length one-sixth or less the length of lateral cephalic margin; colour yellow to yellowish brown .....2
  - Eyes larger, eye length more than one-fifth the length of lateral cephalic margin; colour pale brown to black .....7
2. Gena curving inwards below eyes to close-set mandibular insertions; petiole low and thick, subconical in side view with rounded dorsal crest; queen exceedingly small (HW 760-790  $\mu$ m) .....*Lasius carniolicus* Mayr
  - Genal margins straight or curving gently to wide-set mandibular insertions; petiole tapering dorsally in side view; queen larger in size (HW > 790  $\mu$ m) .....3
3. Petiole, in frontal view, with deeply emarginate dorsal crest .....*Lasius bicornis* Foerster
  - Petiole, in frontal view, with unbroken dorsal crest or with shallow emargination .. .....4

4. Large species; head width 950-1250  $\mu\text{m}$  .....5
- Smaller species; head width 670-860  $\mu\text{m}$  .....6
5. Petiole in front view high, conical, tapering to narrow rounded dorsal crest .....*Lasius mikir* Collingwood  
 — Petiole in front view, with broadly rounded sides, dorsal crest convex, occasionally with slight median incision; petiole and basal face of gaster with very long curved hairs; tibiae without projecting hairs; occipital hairs restricted to median area .....*Lasius crinitus* Smith
6. Petiole node in frontal view with feebly convex sides, narrowing towards the crest and somewhat rounded dorsal crest; eye smaller ( $EL < 90 \mu\text{m}$ ) .....*Lasius elevatus* sp. nov.  
 — Petiole in frontal view with sides not narrowing towards the crest and a straight dorsal crest; eye larger ( $EL > 120 \mu\text{m}$ ) .....*Lasius alienoflavus* Bingham
7. Combined total number of hairs on hind tibia plus hairs on scape not exceeding 8 .....8  
 — Combined total number of hairs on hind tibia plus hairs on scape always greater than 8 .....11
8. Dorsum of scape with perfectly appressed pubescence; masticatory margin of mandibles usually with 7 or fewer teeth; pubescence on all surfaces of body perfectly appressed or decumbent, giving smooth appearance .....9  
 — Dorsum of scape with pubescence hairs projecting  $\leq 5 \mu\text{m}$  from cuticular surface; masticatory margin of mandibles usually with 8 or more teeth; pubescence on surface of body not perfectly appressed or decumbent, therefore rough in appearance .....10
9. Size smaller; head and mesosoma yellowish brown to pale brown, gaster dark brown;  $SL/HL < 0.86$ ;  $CI < 104$  .....*Lasius brunneus* (Latreille)  
 — Size larger; head, mesosoma and gaster brown to dark brown;  $SL/HL > 0.87$ ;  $CI > 104$  .....*Lasius himalayanus* Bingham
10. Scape shorter,  $SL/HL < 0.890$ ; mesopropodeal depression deep, mesonotum high and vaulted; mesosoma yellowish brown .....*Lasius breviscapus* Seifert  
 — Scape longer,  $SL/HL > 0.890$ ; mesopropodeal depression shallow; the propodeal dome is more conical; the species is relatively concolorous, with the mesosoma dirty brown.....*Lasius alienus* (Foerster)
11. Paramedian pubescence hairs on posterior dorsum of gastral tergites directed caudomedially or medially; clypeal pubescence extremely sparse ( $PDCL > 30$ ); broad and massive petiolar scale .....*Lasius magnus* Seifert  
 — Pubescence hairs on whole surface of gastral tergites directed strictly longitudinally; clypeal pubescence much denser ( $PDCL < 30$ ); petiolar scale comparatively smaller .....12
12.  $PDCL < 18$ ; propodeal dome high and hemispheric to conic-hemispheric; posteroventral sides of pronotum more-or-less pubescent, somewhat dull; colour of head and gaster blackish brown, mesosoma dark brown to medium brown. ....*Lasius niger* (Linnaeus)  
 —  $PDCL > 18$ ; propodeal dome flatter; posteroventral sides of pronotum without pubescence, brilliantly shining; whole body concolorous yellowish to reddish brown.....*Lasius wittmeri* Seifert

Note: The key has been prepared using the relevant literature of Wilson (1955), Collingwood (1982) .....and Seifert (1992).

**ACKNOWLEDGEMENTS**

The authors are sincerely thankful to Dr Bernhard Seifert for helpful comments and suggestions. Financial assistance rendered by the Department of Science and Technology (grant no. SR/SO/AS-65/2007), Ministry of Science and Technology, Government of India, New Delhi, is gratefully acknowledged. We thank Mr Barry Bolton and the anonymous reviewers for their inputs.

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- Figures 1-3. *Lasius elevatus* sp. nov., large worker: 1) Head, dorsal view; 2) Body, lateral view; 3) Body, dorsal view.
- Figures 4-6. *Lasius elevatus* sp. nov., small worker: 4) Head, dorsal view; 5) Body, lateral view; 6) Body, dorsal view.

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