A NEW SPECIES OF THE ANT GENUS *DILOBOCONDYLA* (HYMENOPTERA: FORMICIDAE) FROM INDIA, WITH NOTES ON ITS NESTING BEHAVIOUR

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Introduction

*Dilobocondyla* Santschi (1910) with *Atopomyrmex selebensis* Emery (1898) as the type species, is a small genus of myrmicine ants belonging to the tribe Formicoxenini. It is known by 9 species and 2 subspecies from the Indo-Australian Region (Bolton, 1995). A new species, *D. bangalorica* is here described from India for the first time.


Wheeler (1924) wrote, “All the species of *Dilobocondyla* seem to be rare and very local ants and are therefore known mostly from single specimens. Like the species of the allied genus *Podomyrma* they nest as rather small colonies in the wood of living trees.” In his paper he gave a key to the species and subspecies, of the genus based on workers and gynes, then known.

Materials and Methods

A few *Dilobocondyla* workers were collected on 15 July 2003 from *Plumeria alba* L. (Apocynaceae) tree from the Indian Institute of Science Campus, Bangalore (13°01' N 77°34'E). A worker ant was traced to its nest, a cavity in a dead twig of *P. alba* tree, and later the whole colony was excavated and brought to the laboratory. A thorough survey to study the nesting habits of *D. bangalorica*, sp. nov. was made (May-July, 2004) in Cubbon park and Lalbagh Botanical gardens in Bangalore. A few more nests were found during this survey and three of them were collected on 7 July 2004, to study the colony structure of *D. bangalorica*. Various places in Masinagudi, (Western Ghats), Coorg and Mananthavady (Wayanad district, Kerala) were also surveyed, from May 2004-March 2005, to understand the distribution of *D. bangalorica*, sp. nov. I could not notice the nest of *D. bangalorica* on any other trees and in any other places surveyed.

The holotype is deposited in the Insect Museum at the Centre for Ecological Sciences (CES), Indian Institute of Science, Bangalore. Paratypes will be deposited in the
The linear measurements and indices employed in this study are described below:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Description</th>
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<tbody>
<tr>
<td>HL</td>
<td>Head length: length of head from the posterior margin of the head to the anterior extremity of the clypeus.</td>
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<tr>
<td>HW</td>
<td>Head width: maximum width of head, including the eyes.</td>
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<tr>
<td>EL</td>
<td>Eye length: Length of compound eye measured in the same view as HL.</td>
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<tr>
<td>MFC</td>
<td>Minimum frontal carina distance: minimum distance between the frontal carinae.</td>
</tr>
<tr>
<td>SL</td>
<td>Scape length: length of the first antennal segment, excluding the radicle.</td>
</tr>
<tr>
<td>PRNW</td>
<td>Pronotum width: width of the pronotum at the dorso-lateral margins.</td>
</tr>
<tr>
<td>PTL</td>
<td>Petiole length: length of the petiole, measured in dorsal view.</td>
</tr>
<tr>
<td>PTW</td>
<td>Petiole width: maximum width of the petiole in dorsal view.</td>
</tr>
<tr>
<td>PTH</td>
<td>Petiole height: Maximum height of the petiole, measured in lateral view at right angles to petiole length.</td>
</tr>
<tr>
<td>PPTL</td>
<td>Postpetiole length: Length of postpetiole measured in dorsal view.</td>
</tr>
<tr>
<td>PPTW</td>
<td>Postpetiole width: width of postpetiole measured in dorsal view.</td>
</tr>
<tr>
<td>TL</td>
<td>Maximum measurable length in lateral view.</td>
</tr>
<tr>
<td>CI</td>
<td>Cephalic index: HW/HL x 100</td>
</tr>
<tr>
<td>SI</td>
<td>Scape index: SL/HW x 100</td>
</tr>
<tr>
<td>PTWI</td>
<td>Petiole width index: PTW/PTL x 100</td>
</tr>
<tr>
<td>PPTWI</td>
<td>Postpetiole width index: PPTW/PPTL x 100</td>
</tr>
</tbody>
</table>

**Dilobocondyla Santschi**


*Podomyrma (Mesomyrma)* Stitz, 1911: 363. Type species: *Podomyrma (Mesomyrma) cataulacoidea* Stitz; by monotypy. Synonymy by Emery, 1912: 102.

**Diagnosis:** Head in frontal view with occipital corners acutely angulate to dentate; frontal carinae and antennal scrobes present and well developed; midpoint of anterior clypeal margin with an unpaired median seta; apical margin of mandibles with 6 teeth, mandibles elongate-triangular; palp formula 4, 3; antennae 12 segmented with 3 segmented club; compound eyes present and of moderate size. Mesosoma and petiolar nodes unarmed; petiole pedunculate with an anteriorly directed ventral tooth; postpetiole articulated on anterior surface of the first gastral segment. Gaster small and circular in dorsal view.

**Synonymic list of Dilobocondyla species**

The 12 species of *Dilobocondyla*, distributed in the Indo-Australian Region, are listed below:

   =*braunsi* Forel, 1912: 767 (synonymy by Bolton, 1982: 325)
   =*concolor* Viehmeyer, 1914: 40 (w.) (synonymy by Taylor 1991: 601)
   =*escherichi* (Forel), 1911: 223 (w.) (synonymy by Donisthorpe, 1932: 576).
   Raised to species by Taylor 1991: 601.
   Raised to species.
   Raised to species.

**Dilobocondyla bangalorica**, sp. nov.  

*Holotype Worker* (Plate 1, 1&2): Head (Plate 1, 3) as long as broad (CI 100), slightly broader behind than in front, with almost straight cheeks, posterior corners dentate, directed outwards and broadly emarginated. Mandibles large and convex with 6 teeth (Plate 1, 4). Palp formula 4, 3. Clypeus almost flat, antero-medially emarginated, with a clear notch in the middle and sinuate at the corners with ridges. Frontal area distinct and triangular; frontal carinae long, sharp and continued to the posterior corners of the head, roughly 11 strong rugae between frontal carinae, antennal scrobes deep and well defined. Antennae slender, 12 segmented with 3 segmented club; scape (SL 0.60, SI 66) slightly curved at the base, funiculus reaching about 1/3 the length of the head. Eyes large (EL 0.20) and convex and almost in the middle of the sides. Thorax broad, not broader than head, pronotum broader than long (PRNW 0.65), its anterior lateral angles projecting outwards as tooth (Plate 1, 5), pro-mesonotal suture indistinct dorsally, meso-metanotal suture distinct and broadly constricted. Propodeum rounded and convex above with an abrupt small concave declivity (Plate 1, 6). Metasternal angles lamellate and rounded. Petiole long (Plate 1, 7) (PTL 0.40, PTH 0.20) and arcuate in profile; 2.0x as long as broad (PTWI 50), with a strong antero-ventral, anteriorly directed tooth. Postpeti- 

*Measurements:*  

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Worker (n=9)</th>
<th>Queen</th>
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<tbody>
<tr>
<td>TL</td>
<td>3.40-4.05</td>
<td></td>
</tr>
<tr>
<td>HW</td>
<td>0.88-0.90</td>
<td></td>
</tr>
<tr>
<td>HL</td>
<td>0.88-0.95</td>
<td></td>
</tr>
<tr>
<td>EL</td>
<td>0.20</td>
<td></td>
</tr>
<tr>
<td>MFC</td>
<td>0.30-0.35</td>
<td></td>
</tr>
<tr>
<td>SL</td>
<td>0.55-0.60</td>
<td></td>
</tr>
<tr>
<td>PRNW</td>
<td>0.50-0.55</td>
<td></td>
</tr>
<tr>
<td>PTL</td>
<td>0.28-0.30</td>
<td></td>
</tr>
<tr>
<td>PTW</td>
<td>0.30-0.40</td>
<td></td>
</tr>
<tr>
<td>PPTL</td>
<td>0.28-0.30</td>
<td></td>
</tr>
<tr>
<td>PPTW</td>
<td>0.30-0.40</td>
<td></td>
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</tbody>
</table>

*Queen*: Similar to workers in colour (little darker) and sculpture. Head as long as broad, ocelli present, clypeus depressed in middle, deeply emarginated with well formed
carinae. Antennae 12 segmented, with 3 segmented club; antennal scrobes well developed and running to the top of the head. Thorax gibbous, not broader than head; pro-mesonotal and meso-metanotal suture well developed. Pronotum wider than in workers, postpetiole longer and wider than in workers. Gaster circular in dorsal view. Femora and tibiae incrassated as in workers.

**Measurements**: TL 4.75; HW 1.05, HL 1.05, EL 0.25, MFC 0.40, SL 0.65, PRNW 0.85, PTL 0.50, PTW 0.25, PTH 0.25, PPTL 0.43, PPTW 0.40, CI 100, SI 62, and PTWI 50, PPTWI 94.11.

**Allotype Male** (Plate 3, 1): Same data as the holotype and paratypes: Head distinctly broader than long (CI 123), broader medially with rounded cheeks, posteriorly weakly emarginated, posterior corners not evidently dentate as in workers. Mandibles well developed and somewhat convex (reduced when compared to that of workers) with distinct teeth. Clypeus nearly flat, its anterior border rounded and entire. Frontal area distinct, frontal carinae not very long, and not continued to the posterior corners of the head. Antennal scrobes well defined. Antennae 13 segmented, longer and stouter than in workers, but with no distinct club, scape remarkably short (SL 0.15), first funicular segment very small, broader than long, remaining funicular segments cylindrical and longer than broad. Eyes large and convex and almost in the middle of the sides of the head, ocelli large and distinct. Pronotum broader than head, its anterior lateral borders form angles, but not project as tooth as in workers, mesonotum convex and broader than pronotum. Wings transparent (Plate 3, 2 & 3). Propodeum rounded and convex above with an abrupt small concave declivity. Petiole long (PTL 0.40), more than 2x as long as broad (PTWI 45) with a very weak ventral tooth. Gaster small, elongate, and convex above. Legs long and slender, femora clearly and tarsi slightly incrassated, less incrassated than in workers.

Head, thorax and petiole deeply sculptured, postpetiole and gaster smooth, mandibles rather smooth, clypeus longitudinally striate, base of gaster not striate as in workers, coxae and femora smooth and shining.

Body hairs long, subereect and sparse.

Black, head, thorax and petiole darker, gaster posteriorly brownish black, mandibles, antennae and legs pale white, coxae, femora and tibiae with tinge of brown; wings whitish with colourless veins.

**Measurements**: TL 3.40; HW 0.80, HL 0.65, EL 0.30, MFC 0.18, SL 0.15, PRNW 0.65, PTL 0.40, PTW 0.18, PTH 0.20, PPTL 0.30, PPTW 0.25, CI 123, SI 19, PTWI 45, PPTWI 83.

Male genitalia as in figures 4, 5, 6 and 7 in Plate 3. It consists of a pair of well developed parameres, a pair of volsella and the median aedeagus. Anterior margin of hypopygium biconcave, with a prominent median rounded lobe, anterior lateral lobes prominent and rounded, sides slightly concave, posterior border more or less rounded and hairy; outer border of paramere convex, anteriorly rounded, inside concave, and medially slightly constricted; volsella well developed, volsella consists of cuspis and digitus, cuspis of volsella projects out from parameres; aedeagus narrow, broader in the middle, tapering anteriorly with a distinct pointed tip.

Paratypes: 91 workers, same data as holotype. INDIA: Karnataka: Bangalore: Jubilee Garden, 13°01’N 77°34’E. Paratypes are deposited in the Insect Museum at the Centre for Ecological Sciences (CES), Indian Institute of Science, Bangalore. 2 Paratypes each will be deposited at the Museum of the Zoological Survey of India, Kolkatta (India), and at the British Museum of Natural History, London.


Comparison: Dilobocondyla bangalorica keys to couplet 8 in Wheeler (1924). It comes closest to D. cataulacoidea in having (1) an average worker size above 3.25mm, (2) frontal carinae sharp, continuing to the posterior corners of the head, (3) similar body colour, (4) distinct meso-metanotal constriction, and (5) pronotum broader than long. D. bangalorica, however, is distinguished from D. cataulacoidea by the following characters: Smaller worker size, (D. bangalorica worker 3.93, vs D. cataulacoidea 4.50), head width less than 1.00 (HW 1.03 in D. cataulacoidea), gaster striate only at base and brownish black (gaster longitudinally striate and black in D. cataulacoidea), mandibles with 6 teeth (5 teeth in D. cataulacoidea), and head as long as broad (CI 100, except one worker in D. bangalorica (head longer than broad in D. cataulacoidea).

D. bangalorica also differs from other known species by having a small worker size (3.93), by smaller queen size (4.75), having the thorax and pedicel sculptured, by its coloration, having 6 well defined mandibular teeth, and by having less rugosities between frontal carinae.

Etymology: The species is named after its type locality, Bangalore.

Distribution and biology: Dilobocondyla bangalorica was found nesting in a cavity of live Plumeria alba L. tree at the Indian Institute of Science Campus (Plate 4, 1). A single colony contained 1 queen, 91 workers, 15 males, 15 eggs, 10 pupae and 127 larvae at different developmental stages. The nest was shallow and wide (Plate 4, 2, 3 & 4). The workers forage individually on tree trunks and among foliage (Plate 4, 5 & 6). When disturbed, they hide in deep grooves on tree trunk. Eggs are small (Plate 4, 7) and roughly oval. Larvae are elongate cylindrical with segmented body (Plate 4, 8). They have a well formed neck, posteriorly little robust and rounded.

A comprehensive survey was made (May 2004- March 2005) in and around Bangalore, Masinagudi (Western Ghats), Coorg and in Mananthavady district of Kerala state to study the distribution and nesting behaviour of D. bangalorica. I saw 5 more nests of D. bangalorica on live Plumeria tree, two at the Cubbon Park, and one at the Indian Institute of Science campus, Bangalore respectively.

One nest of D. bangalorica was collected from P. alba tree, at the Indian Institute of Science Campus on 7 July 2004. It contained 14 workers, 14 males, 5 alates, 2 eggs, 34 larvae and 16 pupae. Either I failed to get the queen or that was an orphaned colony.

On the same day (7 July 2004), two nests of D. bangalorica from P. rubra were collected from the Cubbon park, and contained 1 queen, 43 workers, 31 alates, 14 males, 13 eggs, 58 larvae, 23 pupae, and 22 workers, 1 male, 13 alates, 1 egg, 26 larvae and 13 pu-
D. bangalorica prefers to inhabit the holes on dead twigs of 2 species of Plumeria tree, *P. alba* L., and *P. rubra* L.

**Acknowledgments**

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**References**


Plate 1. Figures 1-8, *Dilobocondyla bangalorica*, sp. nov., paratype worker: 1, profile; lateral view 2, dorsal view 3, head; frontal view; 4, mandibles; 5, antero-lateral corners of pronotum showing pronotal teeth; 6, alitrunk, lateral view; 7, petiole, lateral view; 8, petiole and post petiole, dorsal view.
Plate 2. Figures 1-6, *Dilobocondyla bangalorica*, sp. nov., paratype worker: 1, gaster, dorsal view; 2, gaster, lateral view; 3, legs; 4, tarsus enlarged; 5, femur of hind leg enlarged to show setae; 6, setae on femur enlarged.
Plate 3. Figures 1-7, *Dilobocondyla bangalorica*, sp. nov., Male: 1, profile, lateral view; 2, fore wing; 3, hind wing; 4, hypopygium; 5, genitalia, dorsal view; 6, genitalia, inner view showing volsella and aedeagus; 7, volsella showing cuspis and digitus.
Plate 4. Figures 1-8. 1, host plant, Plumeria alba L.; 2, nest on Plumeria alba hole; 3, 4, nest opened; 5, Dilobocondyla bangalorica, sp. nov. workers foraging on Plumeria alba trunk; 6, D. bangalorica, sp. nov. forager among foliage of Plumeria alba trunk; 7, eggs; 8, larva, lateral view.