Materials and Methods
MATERIALS AND METHODS

For proper execution of a research proposal, methodology is an important component, since it forms the basis on which some legitimate, logical and sound inference could be generated. It includes meticulous planning, diligent efforts, and taking into account even minor observations, besides perseverance. With this thought the methodology for present work was designed and executed as per following norms;

(1) Three sampling sites were selected for each elevation, one in extreme north, other in center and the third one in extreme southern flank in Jammu-Kashmir Himalaya.

(2) The sampling sites were selected at an altitude of 500 meters, 1000 meters, 2000 meters, 3000 meters and 4000 meters above mean sea level. As a shift in altitude of 1000 meters in Himalayan region has pronounced effect on temperature, precipitation, humidity, decomposition and of course vegetation, all these factors culminate and produce cumulative effect on species diversity, abundance and composition of ants (worthy of mentioning here that 500 meters elevation gradient was chosen to generate base line data, as this altitude represents the origination of Himalayan ranges, the so called Siwalik range).

(3) To increase the effectiveness of this study sampling sites were preferred much interior into forest to avoid edge effect and with the intent of sampling representative microhabitats found at each elevation.

(4) The sampling was carried using standard protocols designed for elevational gradient studies\(^1\) by Fisher (2004);

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\(^1\)The words elevation and altitude are used alternatively in the thesis to avoid monotony, as used in such type of earlier studies also.
(i) At each elevation different sampling methods (mentioned below) were used in a 250 meters transect.

(ii) Pitfall traps made up of test tubes with an 18mm internal diameter, 150mm length, partly filled to a depth of about 50 mm with soapy water and 5% ethylene glycol solution, inserted into PVC sleeves, were buried with the rim flush with the soil surface.

(iii) Leaf litter inside each plot was collected and sifted through a wire sieve with square holes of 1 cm x 1 cm; before sifting, the material was chopped with a machete to disturb ant nests in small twigs and decayed logs. Ants and other invertebrates were extracted from the sifted litter during a 48-hour period in winkler sacks.

(iv) To sample canopy ants in transect stick beating method was used.

(v) Soil core method was used to target hypogaeic ants, where soil cores 20 x 20 x 15cm³ deep were taken at equal intervals along the transect. These soil cores were sifted using a hand sieve pan to collect ants.

(vi) Finally, ants were collected by honey bait and hand picking method as well. It comprised searching rotten logs, stumps, dead and live branches, twigs, low vegetation, termite mounds and under stones.

(5) Each sample taken/treated during the study comprised of a unit of different sampling efforts (as mentioned above) employed in a plot of 5 meters² in a 250 meters transect, each plot being 5 meters apart.

(6) Habitat/Abiotic parameters as temperature, humidity, leaf litter layer thickness were recorded at the site under question and data pertaining to precipitation were taken from local meteorological station.

(7) The collected specimens were mounted on triangles, as per standard procedure in ant taxonomy for identification purposes.
The identified material was authenticated with the help of other myrmecologists and was also compared with reference collection lying in the laboratory.

The data generated have been analyzed by ‘Colwell estimatesS’ and ‘R language’ softwares for statistical interpretation.

### Table showing the sites surveyed during the study

<table>
<thead>
<tr>
<th>Altitude</th>
<th>Site A (with GPS coordinates)</th>
<th>Site B (with GPS coordinates)</th>
<th>Site C (with GPS coordinates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 meters</td>
<td>32.475012°N,75.481567°E Barwal (Kathua)</td>
<td>32.941844°N,74.665833°E Garh (Jammu)</td>
<td>32.985628°N,74.100037°E Bhimber (Sunderbani)</td>
</tr>
<tr>
<td>1000 meters</td>
<td>32.628891°N,75.61539°E Sukarala (Kathua)</td>
<td>32.87036°N,74.96933°E Domail (Jammu)</td>
<td>33.134101°N,74.225006°E Nowshera (Rajouri)</td>
</tr>
<tr>
<td>2000 meters</td>
<td>32.812947°N,75.762503°E Sarthal (Kathua)</td>
<td>33.098626°N,75.327174°E Patnitop(Udhampur)</td>
<td>33.611188°N,73.91120°E Tatta pani (Rajouri)</td>
</tr>
<tr>
<td>3000 meters</td>
<td>33.486435°N,75.84137°E Sandar (Kishatwar)</td>
<td>33.486435°N,75.84137°E Aharbal (Shopian)</td>
<td>34.073137°N,74.031372°E Uri (Baramula)</td>
</tr>
<tr>
<td>4000 meters</td>
<td>33.908035°N,74.40628°E Affarwatt (Gulmarg)</td>
<td>34.289559°N,75.478821°E Zozila Pass</td>
<td>34.168068°N,77.6026°E Leh (Ladakh)</td>
</tr>
</tbody>
</table>

In addition to above sites, following sites were also visited at 3000 meters above mean sea level:

1. Drass 34.427868°N,75.750732°E
2. Lamayuru 34.282184°N,76.787567°E
3. Kargil 34.530884°N,76.146927°E
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Map A. Showing the sites surveyed during the study

Map B. Showing the highly forested areas (green colour) in Jammu-Kashmir Himalaya