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## Species distribution of ants (Formicidae) hymenoptera of district Swabi Khyber pakhtunkhwa, Pakistan

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**Abstract**

Field survey was conducted to explore the species prevalence of the ants fauna (Formicidae: Hymenoptera) in the District Swabi, Khyber Pakhtunkhwa Pakistan. Ants were collected from 15 different localities during 2016 to 2017. The study resulted 2 subfamilies Camponotinae and Myrmicinae, under 15 species in 9 genera were recorded. The subfamily Camponotinae revealed 8 species namely, *Formica sanguinea*, *Acantholepis franefeldi*, *Camponotus japonicas*, *Camponotus invidus*, *Camponotus sericeus*, *Camponotus variegatus*, *Camponotus compressus* and *Camponotus confucii*. The subfamily Myrmicinae revealed 7 species namely, *Crematogaster rothneyi*, *Meranoplus bicolor*, *Monomorium pharaonis*, *Holcomyrmex scabriceps*, *Holcomyrmex glaber*, *Phidole indica*, and *Tetramorium nursei*. Three species *Camponotus invidus*, *Camponotus variegatus* and *Phidole indica* are new to the ants fauna of Pakistan. Details description of each species, valid scientific names, their habitat, ecological observation, collection date and distributional range for all recorded species were provided.

**Keywords:** Ants, formicidae, hymenoptera distribution, swabi

**1. Introduction**

Ants are the social insects that belong to family Formicidae and along with related bees and wasps of order Hymenoptera [1]. They vary in color and depend on species variation which may have red, black, green and metallic bodies [2]. Ants live in small natural cavities and form extremely high systematized colonies that may inhabit large places and consist of millions individuals [3]. Ants pass through complete metamorphosis with larval stages and passing through a pupal stage before developing into adult [4]. Ants use pheromones as a source of communication between them. To regulate the direction ants use polarized detector cells which are present in their compound eyes [5]. The use of pheromones in ants was highly developed, the paired antennae in ants provide the right direction and intensity of scents as most species of ants are living on the ground they use soil surface to leave pheromones which is followed by other ants for direction to their food source [6]. Ants have been recognized one of the wonderful insect for studies like taxonomy, biogeography and biodiversity. Formicidae covers 21 subfamilies, 358 genera. Ants have more than 11,000 species worldwide [7]. In Asia about one fourth of ants species are occur [8]. Ants perform many functions at the same time they are decomposers, predator, pollinators, and scavenger [9]. Ants are social insects and because of their social behavior they defend their colonies together. When an attack occurs on their colonies they used certain types of weapon like injection stinging, biting and by using spraying chemicals such as formic acid [10]. The ants species like fire ants have a very unique poisonous sac structure which containing piper dine alkaloids. In south Africa and Africa, the ants species army ants which is used for surgical process [11]. The foraging ants species which have great ability to travel up 700 ft from their nest side. The weaver ants use for food, biological control agents, and for medicine in many regions. Two weaver ants species the one is *Oecophylla smaragdina* which is found in Australia, and Asia. The second is *Oecophylla longinoda* which is found in Africa [12]. Keeping in view of all these details, a survey was carried out to explore Ant fauna (Hymenoptera) of district Swabi Khyber Pakhtunkhwa, Pakistan. Till research on ants is not done in this area, this study will generate some information about the distribution and richness of ants species.

## 2. Materials and Methods

### 2.1 Study Site

Survey was conducted to collect adult ants of family (Formicidae) order (Hymenoptera) from 15 localities of District Swabi, Khyber Pakhtunkhwa, Pakistan during 2016 to 2017. Ants were collected from all tehsils covering the whole district. The localities are (L1) Gabasnai, (L2) Kabghani, (L3) Gandaf, (L4) Panjpir, (L5) Maini, (L6) Shah Mansur, (L7) Chota Lahore, (L8) Anbar, (L9) Jalbai, (L10) Yar Hussain, (L11) Kalu Khan, (L12) Tarakai, (L13) Dagai, (L14) Parmoli, (L15) Ismaila as shown in Fig. 01.

### 2.2 Collection, killing and Preservation

Ants were collected with the help of field aspirator at day time in sunny days. Collection was made from various habitats. After collection specimens were killed in a killing jar having ethyl acetate soaked cotton swabs, and were mounted by pointing them on triangular cards and then pinned. Wet preservation of specimens was made with 70 % of ethyl alcohol and 30% of water. Identification of ant species made on the basis of taxonomic key [13, 14].

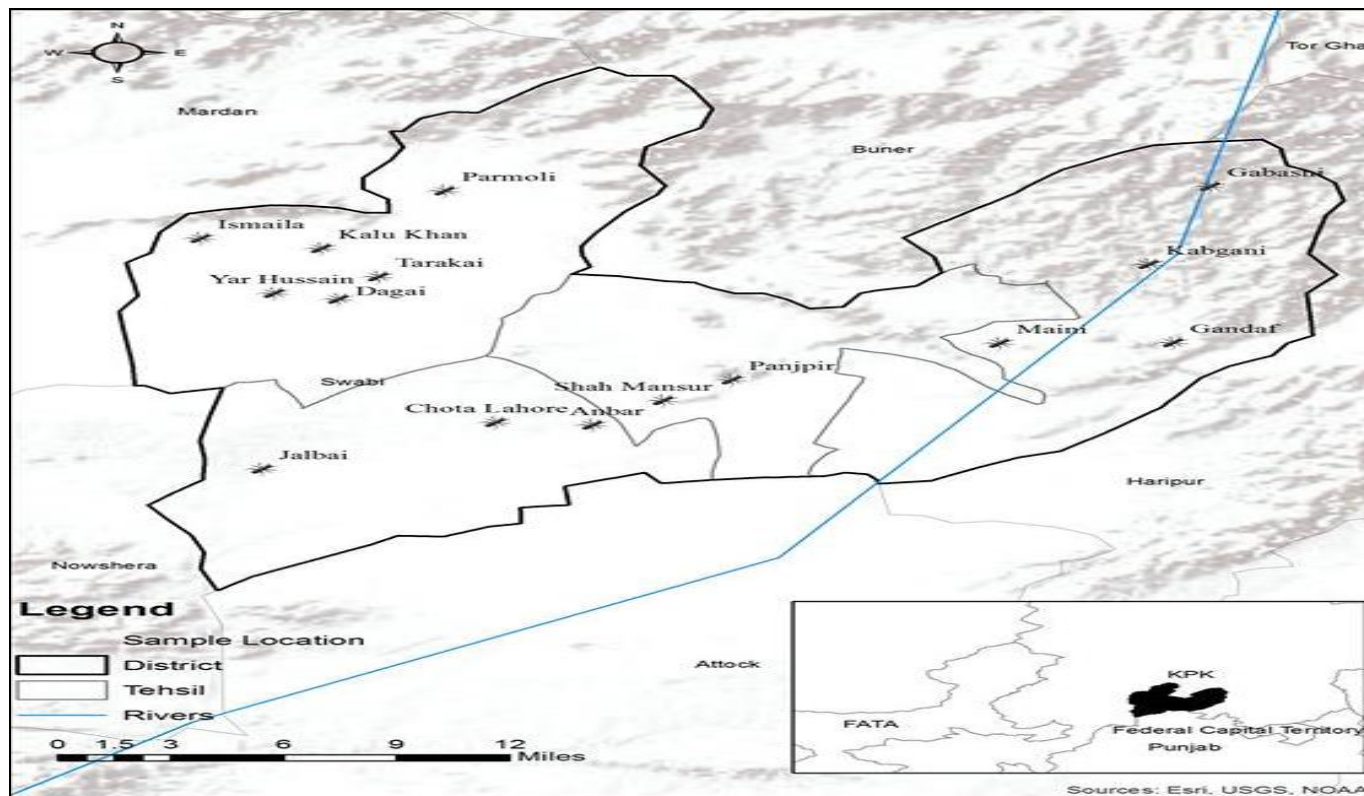


Fig 1: Study sites of district Swabi Khyber Pakhtunkhwa Pakistan

### 3. Results

A total of 15 species from 9 genera under two subfamilies were identified in family Formicidae. Details for the explored fauna of district Swabi Khyber Pakhtunkhwa Pakistan is below.

#### 3.1 Subfamily Camponotinae

##### Genus *Camponotus* Mayr, 1861

##### *Camponotus japonicus* Mayr, 1866

**Specimens examined:** Dagai (L13), 18-iii-2017, 04 workers, leg. Khan; Kalu Khan (L11), 08-iv-2017, 04 workers, leg. Khan; Yar Hussain (L10), 28-ii-2016, 07 workers, leg. Latif; Shah Mansur (L6), 08-vii-2017, 08 workers, leg. Rehman; Jalbai (L9), 19-viii-2017, leg. Rehman, 02 workers; Chota Lahore (L7) 29-vii-2017, 15 workers, leg. Khan; Maini (L5), 08-vii-2017, 07 workers, leg. Khan.

**Previous Records from Pakistan:** Umair *et al.*, [15] reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan.

**Comments:** Collected from road sides, grass lands, and from bare land which have no vegetation.

**World Distribution:** China [16]; India [17].

##### *Camponotus compressus* Fabr, 1787

**Specimens examined:** Dagai (L13), 18-iii-2017, 05 workers, leg. Rehman; Yar Hussain (L10), 28-ii-2014, 12 workers, leg. Rehman; Shah Mansur (L6), 08-viii-2016, 08 workers, leg. Rehman; Jalbai (L9), 19-viii-2017, 02 workers, leg. Khan; Chota Lahore (L7), 29-vii-2017, 14 workers, leg. Khan; Maini (L5), 08-vii-2017, 05 workers, leg. Rehman; Gabasnai (L1), 20-v-2017, 02 workers, leg. Rehman; Kabghani (L2), 25-v-2016, 06 workers, leg. Latif; Gabasnai (L1), 09-ix-2017, 03 workers, leg. Rehman; Gandaf (L3), 09-ix-2017, 04 workers, leg. Khan.

**Previous Records from Pakistan:** Umair *et al.*, [15] reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan. Usman *et al.*, [18] reported this species from Karak Khyber Pakhtunkhwa, Pakistan.

**Comments:** These ants are collected from grasslands, residential buildings, and from ornamentals plants.

**World Distribution:** China [16]; India [17].

##### *Camponotus invidus* Forel, 1892

**Specimens examined:** Gabasnai (L1), 20-v-2017, 02 workers, leg. Khan; Kabghani (L2), 20-v-2017, 03 workers, leg. Rehman; Gabasnai (L1), 09-ix-2017, 01 workers, leg. Khan; Gandaf (L3), 09-vii-2016, 01 workers, leg. Latif.

**Previous Records from Pakistan:** Reported for the first time from Pakistan.

**Comments:** These species were collected from tree holes.

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### ***Camponotus variegatus* Smith, 1858**

**Specimens examined:** Panjpir (L4), 17-vi-2017, 04 workers, leg. Latif; Maini (L5), 08-vii-2017, 02 workers, leg. Khan; Tarakai (L12), 29-iv-2017, 08 workers, leg. Rehman; Dagai (L13), 18-iii-2017, 05 workers, leg. Rehman; Parmoli (L14), 18-iii-2017, 06 workers, leg. Khan; Yar Hussain (L10), 28-ii-2016, 03 workers, leg. Latif; Jalbai (L9), 19-vii-2016, 06 workers, leg. Rehman

**Previous Records from Pakistan:** Reported for the first time from Pakistan.

**Comments:** These ants are collected from dead trunks of trees, and from residential buildings

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### ***Camponotus confucii* Forel, 1894**

**Specimens examined:** Gabasnai (L1), 20-v-2017, 02 workers, leg. Khan; Gabasnai (L1), 09-x-2017, 03 workers, leg. Rehman; Kabghani (L2), 20-v-2017, 04 workers, leg. Latif.

**Previous Records from Pakistan:** Umair *et al.*, <sup>[15]</sup> reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan.

**Comments:** Collected from grasslands, and from soil which have no vegetation.

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### ***Camponotus sericeus* Fabr, 1798**

**Specimens examined:** Panjpir (L4), 17-vi-2017, 11 workers, leg. Latif; Panjpir (L4), 07-x-2017, 09 workers, leg. Rehman; Maini (L5), 08-vii-2016, 6 workers, leg. Latif; Shah Mansur (L6), 08-vii-2017, 5 workers, leg. Latif; Shah Mansur (L6), 07-x-2017, 08 workers, leg. Rehman; Tarakai (L12), 29-iv-2017, 4 workers, leg. Rehman; Dagai (L13), 18-iii-2017, 07 workers, leg. Rehman; Parmoli (L14), 18-iii-2017, 02 workers, leg. Khan; Ismaila (L15), 28-vii-2016, 07 workers, leg. Khan.

**Previous Records from Pakistan:** Umair *et al.*, <sup>[15]</sup> reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan

**Comment:** These specimens were collected from pine trees, grassy vegetation, and from different vegetables.

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### **Genus *Formica* linn, 1758**

##### ***Formica sanguinea* Forel, 1894**

**Specimens examined:** Gabasnai (L1), 20-v-2017, 04 workers, leg. Khan; Gabasnai (L1), 09-x-2017, 02 workers, leg. Rehman; Kabghani (L2), 20-v-2017, 01 workers, leg. Latif.

**Previous Records from Pakistan:** Usman *et al.*, <sup>[18]</sup> reported

this species for the first time from Karak Khyber Pakhtunkhwa, Pakistan.

**Comments:** Collected from road sides, grass fields, and from trees.

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### **Genus *Acantholepis* Mayr, 1866**

##### ***Acantholepis franefeldi* Mayr, 1855**

**Specimens examined:** Ismaila (L15), 28-ii-2017, 05 workers, leg. Khan; Yar Hussain (L10), 28-ii-2017, 06 workers, leg. Latif; Chota Lahore (L7), 28-vii-2016, 03 workers, leg. Latif.

**Previous Records from Pakistan:** Umair *et al.*, <sup>[15]</sup> reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan

**Comments:** These ants are collected from grassy vegetation, and from tree holes

**World Distribution:** India <sup>[17]</sup>.

### **3.1 Subfamily Myrmicinae**

#### **Genus *Crematogaster* Lund, 1831**

##### ***Crematogaster rothneyi* Mayr, 1878**

**Specimens examined:** Gabasnai (L1), 09-x-2017, 09 workers, leg. Khan.

**Previous Records from Pakistan:** Umair *et al.*, <sup>[15]</sup> reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan. Usman *et al.*, <sup>[18]</sup> Reported this species from Karak Khyber Pakhtunkhwa, Pakistan.

**Comments:** Collected from grassy lands, and from pine trees.

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### **Genus *Meranoplus* Smith, 1854**

##### ***Meranoplus bicolor* Guer, 1878**

**Specimens examined:** Parmoli (L14), 15-v-2016, 03 workers, leg. Khan; Tarakai (L12), 29-iv-2017, 01 workers, leg. Rehman; Jalbai (L9), 19-viii-2017, 02 workers, leg. Latif.

**Previous Records from Pakistan:** Umair *et al.*, <sup>[15]</sup> reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan.

**Comments:** Collected from bare land, and from grass fields.

**World Distribution:** China <sup>[16]</sup>; India <sup>[17]</sup>.

#### **Genus *Holcomyrmex* Mayr, 1878**

##### ***Holcomyrmex scabriceps* Mayr 1878**

**Specimens examined:** Maini (L5), 08-vii-2017, 04 workers, leg. Khan; Shah Mansur (L6), 08-vii-2017, 07 workers, leg. Khan; Chota Lahore (L7), 29-vii-2017, 08 workers, leg. Rehman; Jalbai (L9), 19-viii-2017, 03 workers, leg. Rehman; Dagai (L13), 18-iii-2017, 02 workers, leg. Latif; Yar Hussain (L10), 28-vi-2016, 07 workers, leg. Rehman,

**Previous Records from Pakistan:** Umair *et al.*, <sup>[15]</sup> reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan. Usman *et al.*, <sup>[18]</sup> Reported this species from Karak Khyber Pakhtunkhwa, Pakistan

**Comments:** Collected from cereal crops, roadsides, and from grass fields.

**World Distribution:** Distributed irregularly throughout India <sup>[17]</sup>.

##### ***Holcomyrmex glaber* Andre, 1883**

**Specimens examined:** Shah Mansur (L6), 08-vii-2017, 03 workers, leg. Khan; Chota Lahore (L7), 29-vii-2017, 06 workers, leg. Khan; Jalbai (L9), 19-viii-2017, 03 workers, leg. Rehman; Dagai (L13), 18-iii-2017, 02 workers, leg. Latif; Yar Hussain (L10), 28-ii-2017, 03 workers, leg. Khan.

**Comments:** Collected from cereal crops, and from grass fields.

**Previous Records from Pakistan:** Umair *et al.*, [15] reported this species for the first time from Potohar Plateau of Punjab Province, Pakistan. Usman *et al.*, [18] Reported this species from Karak Khyber Pakhtunkhwa, Pakistan

**World Distribution:** India [17].

#### Genus *Monomorium* Mayr, 1855

##### *Monomorium pharaonis* Linn, 1758

**Specimens examined:** Panjpir (L4), 17-vi-2017, 02 workers, leg. Khan; Panjpir (L4), 07-x-2017, 01 workers, leg. Khan; Dagai (L13), 28-vi-2016, 05 workers, leg. Latif; Parmoli (L14), 18-iii-2017, 06 workers, leg. Rehman; Gabasnai (L1), 09-x-2017, 02 workers, leg. Khan.

**Previous Records from Pakistan:** Hina *et al.*, [19] Reported this species for the first time from Quetta Baluchistan, Pakistan.

**Comments:** Collected from grass lands, residential buildings

**World Distribution:** China [16]; India [17].

#### Genus *Phidole* Westw, 1841

##### *Phidole indica* Mayr, 1878

**Specimens examined:** Tarakai (L12), 29-iv-2017, 02 workers, leg. Khan; Dagai (L13), 18-iii-2017, 03 workers, leg. Khan; Parmoli (L14), 18-iii-2017, 01 worker, leg. Khan; Ismaila (L15), 28-ii-2017, 04 workers, leg. Rehman.

**Previous Records from Pakistan:** Reported for the first from Pakistan.

**Comments:** Collected from grasslands and tree trunks.

**World Distribution:** China [16]; India [17].

#### Genus *Tetramorium* Mayr, 1855

##### *Tetramorium nursei* Bingham, 1903

**Specimens examined:** Yar Hussain (L10), 28-ii-2014, 04 workers, leg. Khan; Jalbai (L9), 19-viii-2017, 02 workers, leg. Khan; Chota Lahore (L7), 29-vii-2017, 03 workers, leg. Khan.

**Previous Records from Pakistan:** Bingham [13] Reported this species from Quetta Baluchistan, Pakistan

**Comments:** Collected from trees, road sides, and from under soil

**World Distribution:** China [16]; India [17].

#### 4. Discussion

Pakistan is situated between latitude of 23 35' to 37 05' north and longitudes of 60 50' to 77 50' East, and with a total area of 796,096 km<sup>2</sup>. The country has a sub-tropical and semi-arid climate. Average maximum temperature of 40 c while the minimum temperature in the winter is a few degrees above the freezing point. Bio-geographical major part of Pakistan is Palearctic (Hindu Kush, Karakorum, Western Himalayas, Sulaiman Range, North Pakistan sandy desert, and western Indus valley) while the rest of the area is Oriental (Eastern Indus Valley desert, Indus River Delta, and Thar desert.

Hindu kush, Karakorum, and the Himalayas are the major biogeographic boundaries between sub-tropical and tropical flora and fauna of India sub-continent and temperate climate [20]. Oriental representation of species is continuing with those of Indian Punjab and Rajasthan and Palearctic is continuous with those of Iranian, Baluchistan, eastern Afghanistan, Russia, Northwestern and eastern China. Ethiopian Influence which run along the southern coastal areas of Sindh and eastern Mekran in Baluchistan [21]. They assembled a database which representing 13,000 records for ant generic distribution from over 350 regions which cover much of the globe, identified 25 regions of the world in which the knowledge of ant diversity is most limited, based on two models of diversity and endemism, regions we called hotspots of discovery, Pakistan is also included in the list [22]. Studies has been carried out in this part of the world study by Bingham [13] before partition of subcontinent since partition, in 1947 only 3 studies have been carried out to explore the ants fauna of Pakistan. Umair *et al.*, [15] identified 21 species, 13 genera under three subfamilies, this study was limited to only two districts of Punjab province, Pakistan. Hina *et al.*, [19] Identified 7 species, 7 genera under three subfamilies, from Baluchistan, Pakistan. Usman *et al.*, [18] Identified 17 species, 12 genera under two subfamilies in family Formicidae, from Karak Khyber Pakhtunkhwa, Pakistan. The above cited Biogeographical position highlights the importance and possibility of ants species inhabiting in this part of the world.

#### 5. Conclusion

Keeping in view the record of the current study it becomes obvious and is strongly recommended that there is a need to further explore the ant fauna of the country. We can never use this important group of insect in right direction until we know its actual species composition.

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