



Research Article

# First Record of *Carebara raja* (Forel, 1902) (Hymenoptera: Formicidae: Myrmicinae) from Pakistan

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MTR and AGF collected the data and wrote the manuscript. IM confirmation of species, contribution during manuscript write-up and photography. MSK collected field data and prepared ecological note.

### Keywords

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**Abstract** | *Carebara* Westwood (1840) is a species rich genus in subfamily Myrmicinae. Many species of this genus are reported from various parts of the world including neighbouring countries of Pakistan. Members of this genus are considered as generalized foragers and cryptic in nature. Collected material was verified using most recent and available literature provided by Bharti and Akbar (2014). Herein we report one species of this genus *C. raja* (Forel, 1902) based on queen for the first time from Himalayan Foothills of Pakistan. Differential diagnosis, morphometric and illustrations are provided with notes on distributional range.

**Novelty Statement** | *Carebara raja* (Forel, 1902) genus and species is recorded for the first time from Pakistan.

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## Introduction

The most speciose ant genus, *Carebara* Westwood (1840) of subfamily Myrmicinae have 250 reported species and distributed in tropical and subtropical region of the world (Aldawood *et al.*, 2011; Bolton, 2014; Fischer *et al.*, 2014). Ants of this genus comprise monomorphic, dimorphic, polymorphic and cryptic species, prefer to nests in dead woods and leaf material (Bolton, 1973; Longino, 2004; Aldawood *et al.*, 2011; Bharti and Akbar, 2014). Few species of *Carebara* are predatory in nature (Fischer, 2012).

Limited information is available about the biology of *Carebara* species (Fernández, 2006, 2010). Genus *Carebara* is classified into minor and major worker along with its intermediate sub castes (Fischer *et al.*, 2014).

Genus *Carebara* has been systematically treated by various scientists viz. Fernández (2006, 2010). They provided the junior synonyms of *Carebara* such as *Aeromyrma*, *Afroxyidris*, *Anelus*, *Crateropsis*, *Erebomyrma*, *Hendecatella*, *Lecanomyrma*, *Neoblepharidatta*, *Nimbamyrma*, *Oligomyrmex*, *Paedalgus*, *Parvimyrmex*, *Solenops*, *Spelaemyrmex* and *Sporocleptes* which have been considered as junior synonyms of genus *Carebara*. *Pheidologeton* Mayer (1862) synonymized under *Carebara* by Fischer *et al.* (2014).

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As far as taxonomic studies on genus *Carebara* are concerned, from Oriental region significant contributions on this genus performed by Xu (2003); Guénard and Dunn (2012); Akbar and Bharti (2017). According to them, 41 species have been reported across the Oriental part of the world. Four species have been described from Taiwan (Terayama *et al.*, 2012). According to Karaman and Kiran (2017) only one species is recorded from Turkey. Fischer *et al.* (2014) reported 6 species from Sri Lanka. However, many species of genus *Carebara* have also been described from neighboring countries of Pakistan for example 31 species have been explored from China (Guénard and Dunn, 2012) and 20 species from India (Bharti and Akbar, 2014). However, in Pakistan a limited taxonomic work on ants has been performed till date (Umair *et al.*, 2012; Bodlah *et al.*, 2016; Bodlah *et al.*, 2017a, b; Rasheed *et al.*, 2018; Rasheed *et al.*, 2019). Prior to current study, no species of this genus has been recorded from Pakistan. The genus *Carebara* Westwood (1840) recorded first time from Pakistan. Based on queen *C. raja* (Forel, 1902) is reported for the first time from Pakistan along with its distributional range, diagnostic note and illustrations.

## Materials and Methods

As a result of extensive surveys during 2015-16 specimens were collected from forest areas of district Rawalpindi (Kotlisatian) and Islamabad. Specimens were collected using mouth aspirator and killed in jar having potassium cyanide. Taxonomic analysis was conducted under Labomed microscope using keys developed by Bharti and Kumar (2013). Digital images were prepared using Labomed CZM6 microscope attached with digital camera (Amscope 18 megapixels, model number MU1803). Prepared images were cleaned by adobe Photoshop CS6 software. Identified specimens were tagged with valid name, habitat, date of collection and elevation. Identified specimens were deposited in the department of Entomology, PMAS-AAUR, Pakistan. Description method and morphometric treatment follows Fernández (2006 2010). The acronyms used for taxon is given below.

### MHNG

Muséum d'Histoire Naturelle, Geneva, Switzerland.

## Results and Discussion

### *Carebara raja* Forel (1902) Figure 1

*Oligomyrmex raja* Forel (1902): 2016 (queen). TL: India. Indomalaya [Syntype: MHNG].

### Description (Queen)

Head rectangular, longer than broad in frontal view, longitudinally striated. Mandibles having 5 blunt teeth.

Clypeus strongly smooth, bicarinate laterally, anterior margin slightly emarginated. Nine segmented antennae along with 2-segmented club, scape smaller in length and not touching the posterior margin of vertex. Eyes slightly longer in length than width, placed laterally in middle of head. In profile view vertex with well-developed three ocelli. Dorsum of head straight in middle and slightly concave laterally. Promesonotum obsolete and forming a single convexity, mesometanotal suture distinct, in lateral view metanotum striated longitudinally while promesonotum smooth and shining, metanotal groove deeply impressed. Propodeum without any spine or teeth. Dorsum straight and slightly truncate. Petiole pedunculated, triangular with thick anterior and posterior face, postpetiole rounded but shorter than petiolar node, in dorsal view width of postpetiole more than petiole. Mesosoma and abdominal surface smooth and shining throughout, petiole punctate throughout. Piliosity: Body having erect and suberect hairs. Dense pubescence at scape of antennae and tibiae. Colour: Body very dark-brown to blackish.

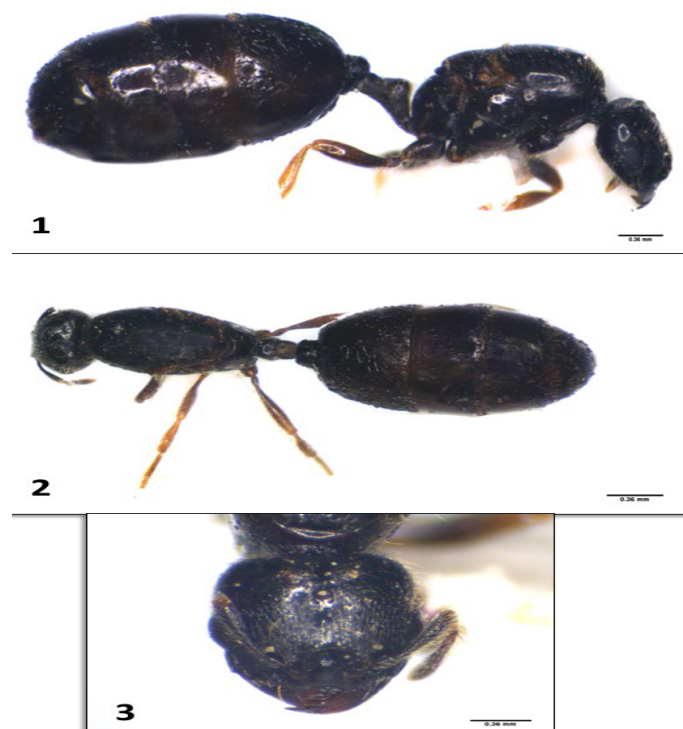


Figure 1: *Carebara raja* Forel (1902), queen: 1: body, lateral view; 2: body, dorsal view; 3: head, full-face view.

### Morphometric (Queen)

(n= 3) TL (Total length): 5.3-5.4; HL (Head length): 0.77-0.78 mm; HW (Head width): 0.75-0.76 mm (above eyes); EL (Eye length): 0.24-0.27 mm; EW (Eye width): 0.14-0.15 mm; SL (Scape length): 0.40-0.41 mm; PW (Pronotum width): 0.7-0.8 mm; ML (Mesosoma length): 1.55-1.57 mm; PH (Petiole height): 0.50-0.51 mm; PW (Petiole width): 0.28-0.29 mm; PPW (Postpetiole width): 0.35-0.36 mm; PL (Petiole length): 0.33-0.34 mm; GL (Gaster length): 2.44-2.46 mm. Indices: CI: 97.40; OI: 33.33; SI: 53.33; DPI: 140

### Distribution

Indomalaya; India (Antweb, 2018). Pakistan (New country record in present study)

### Material examined

01♀, Forest area, rotten wood, Trail 5 (Islamabad) (N33°45.247'E073°05.146), 192.30 m elev., 14.xi.2015; 02♀, Forest area, rotten wood, Kotlisattian (Rawalpindi) (N33°41.902'E073°30.612'), 1260.65 m. elev., 20.x.2016.

### Differential diagnosis (Queen)

*C. raja* belongs to *C. lignata* group, nine segmented antennae and major worker caste absent. Fernández (2004, 2010) described *C. raja* with six another Indian species. According to Bharti and Kumar (2013) *C. raja* closely related to *C. leei* and can be diagnosed on the bases of following characters; clypeus emarginated anteriorly; total body is 5-5.5 mm longer; while clypeus is not emarginated and total body is 7-8 mm longer in *C. leei*.

### Ecology and Conservation of genus *Carebara* Westwood (1840)

This species was observed in rotten woods with sufficient moisture level in pine forest areas of Himalayan Foothills of district Rawalpindi and Islamabad. Worker caste was absent. Based on various studies *Carebara* species found to be encountered in large stone and rotten material in different forest across the world. However, Pakistan has 5.6% of forest land out of total land covered area. Moreover, total forest land drastically decreasing about 5.6-3.36% since 2000. Due to rapid urbanization, farming, overgrazing, tourism development and development of housing societies in protected areas of Pakistan may lead to serious threat of extinction to genus *Carebara* in Pakistan. Various preservation policies including Afforestation, establishment of National Parks and reduction of disturbance in naturally protected areas should be adopted at government level for long-term preservation of these entities.

### Remarks

*C. raja* was originally described by Forel (1902) from Indomalaya (India). Major worker caste of this species unknown to date. Based on original description and distribution of *C. raja* provided by Forel (1902); Bharti and Kumar (2013); Bharti and Akbar (2014); Akbar and Bharti (2017). Herein we reported this species based on queen as a new country record for the ant fauna Pakistan.

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### Conflict of interest

No potential conflict of interest was reported by the authors.

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