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Studies on morphology of *Leptogenys processionalis* (Jerdon 1951) (Hymenoptera: Formicidae) from Aurangabad Maharashtra, India

SD Chate and RJ Chavan

Abstract
Morphology is very important approach to biologists for unique recognition of insect species as compared to close relative. The present study deals with the morphology and taxonomy of ant species *Leptogenys processionalis* from of Aurangabad city with the help of scanning electron microscopy. The Scanning electron microscopy facilitates to confiscate confusions in morphological features in related species with better resolution and clarity. Based on the body profile such as head, antennal scrobe over the eye, thorax, abdomen etc. species are recognized. Thus during present study SEM imaging detected the detailed morphological features such as size, coloration, pilosity on the body and details of head features, structure of alitrunk and gaster. The study recorded in details the features like broad head with small eyes, 12 segmented antenna, broad mandibles, narrow alitrunk, sutures on thorax, convex petiole, tibial spur, pectinate claw. This helped to confirm that the ant specimen observed with the help of SEM is *Leptogenys processionalis.*

Keywords: *Leptogenys processionalis,* SEM imaging, morphology, taxonomy, Aurangabad city

Introduction
Scanning electron microscope is technique widely used to document surface structure of arthropods since the 1970s and can reach resolution below 1nm (Lawson and Chu 1974) [7]. Ants are social insects and belonging to the family Formicidae of the order Hymenoptera. Ants act as bioindicator and play important role in terrestrial ecosystem as well as they play key role in seed dispersal, aerating soil and promotes nutrient cycling and decomposition of dead wood (Holldobler and Wilson 1990) [6]. Ants are arguably one of the most successful organisms on the earth and account for 15-20% of terrestrial animal biomass (Holldobler and Wilson 1990) [6]. Globally there are 12,571 extent species belongs to 21 subfamilies (Bolton 2006) [4]. The Myrmecinae is the largest subfamily of the Formicidae with 138 genera followed by Formicinae with 39 genera and Ponerinae with 25 genera (Bolton 2006) [4]. In India subfamily Ponerinae represent 111 species while *L*eptogenys genera represent 34 species (Bharti *et al.* 2016) [3]. The ant genus *L*eptogenys was first recognized by Roger in 1861 (Bakhtiar and Chiang 2010) [1]. Ant nest of *L*eptogenys are originate in loose debris on the surface of the soil or ground. Nest of these ants are often used for a very short time only before the colony moves to a new site. Workers of these ants have very powerful sting and are predacious. Workers are foraging day and night either singly or in distinct foraging trail (Maschwitz *et al.* 1989) [8]. *L*eptogenys *processionalis* species is shiny and slender bodied ant commonly occur in India. These species play major role in predation on termites mostly but occasionally on other arthropods and annelids (Shankar 1985) [10]. It is necessary to gain knowledge about this genus, it helps to know both biological and ecological diversity in terrestrial ecosystem of the world. The study deals with taxonomy with the help of scanning electron microscope.

Materials and Methods
Study area
The *Leptogenys processionalis* species were collected in Aurangabad city of Maharashtra from periurban habitat such as gardens, hillocks area, vacant place, agricultural site etc. Ants were collected during June 2015 to May 2017 from the study area, by handpicking method, Pitfall trap and Scented trap. Collected ants brought in to the laboratory for identification. Ants were preserved in separate vials with 70% alcohol. In each site study plot of 1 hectare (100 x 100 m)

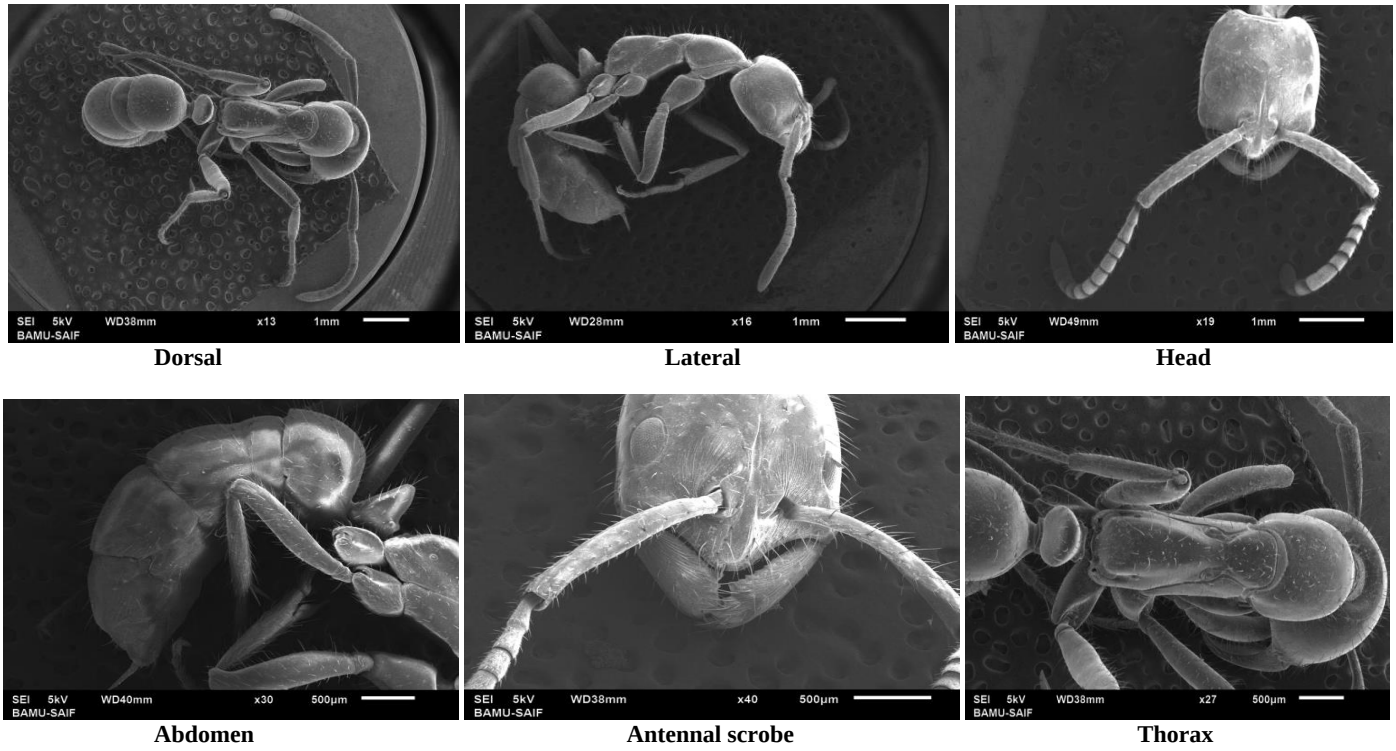
was taken. Ants were collected in 20 x 20 m quadrates by employing three sampling method. Samples were prepared for scanning electron microscopy analysis with the help of following protocol: Ant species were post fixed in 1% Osmium tetraoxide (Bharti *et al.* 2013) [2]. The sample was dehydrated in grade acetone series. After that the species were vacuum dried in desiccators. Dried specimen was attached to the aluminum stubs with double faced conductive adhesive tape. Specimen were placed in the sputter for coating with the palladium and studied under a Joel JSM6510 scanning electron microscope at 5 KV/ EHT.

Results and Discussion

During the present study species belonging to one genus and subfamily Ponerinae were recorded as shown in the following table no. 1. The genus *L*eptogenys was represented as follows.

Table 1: The genus Leptogenys was represented

Subfamily	Genus	Species
Ponerinae	*L*eptogenys	*L*eptogenys *processionalis*



Dorsal **Lateral** **Head**

Abdomen **Antennal scrobe** **Thorax**

Plate 1: Photographs of *Leptogenys processionalis* showing Body Profile: Dorsal view, Lateral view and Head profile

Keys to the species

Leptogenys processionalis **(**Jerdon, 1951)

Family	:	Formicidae
Subfamily	:	Ponerinae
Genus	:	*L*eptogenys
Species	:	*Leptogenys processionalis*

Diagnostic characters:

Body is blackish brown colored except legs and antennae reddish brown, whole body is polished and shining with erect and suberect brownish yellow hairs all over; mandibles broad, longitudinally striate armed at the apex with four unequal teeth and small denticulation along the inner margin. Head is broad, rectangular; Antennae 12 segmented, eyes are small, more towards anterior side of the head; antennae stout, Antennal carinae short very close together, the scape just passing the top of head; Alitrunk slightly narrower than the head, sutures on thorax well marked, propodeum truncate, node of petiole convex in front, flat posteriorly; Posterior tibial spur and all tarsal claws pectinate. Nest of these species generally seen temporary in loose soil. Gaster is massive (Tak. 2008) [12], Bingham (1930) [5], Sheela (2008) [11].

Size: W: Major: TL- 8-9 mm.

Different Character: powerful sting is exserted

Habitat: These ants are ground dwelling.

Material examined: India, Maharashtra, Aurangabad, Periurban, January 2015 – February 2017.

Distribution

All over India, Orissa, Gujarat, Kerala, Karnataka, West Bengal, Tamil nadu, Borneo, Sri Lanka. In India according to updated state wise checklist of ants species *Leptogenys processionalis* is found in Bihar, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Orissa, Rajasthan, Tamil Nadu, Tripura, West Bengal (Bharti. *et. al* 2016) [2]. In the world *Leptogenys* is most diverse ant genus and spread throughout tropical and subtropical region and there are over 200 extent species described (Rakotonirina and Fisher 2014) [7]. Ant species *Leptogenys processionalis* is described in records of the Zoological survey of India, ants (Formicidae) of Rajasthan (Tak. 2008) [12], Bingham, (1930) [5], Sheela. (2008) [11].

Thus during present study SEM imaging detected the detailed morphological features of ants and confirms that the ant specimen observed with the help of SEM is *Leptogenys processionalis.*

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