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## First report of *Lepisiota integra* (Forel, 1894) from Western Ghats of Peninsular India

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**Abstract**

The paper reports a new record of ant species, *Lepisiota integra*, from Western Ghats, Peninsular India. These small to medium-sized ants are typically reddish-brown and are known for their agile movements and ability to form large colonies. The occurrence of *Lepisiota integra* in the coastal area of Shankumugham, which is in stark contrast to its previously reported habitats can be indicative of ecological and biogeographical implications like range expansion, climate change or other ecological indications.

**Keywords:** Ant, Formicinae, Thiruvananthapuram, new report, Western Ghats

**Introduction**

The genus *Lepisiota integra* (Hymenoptera: Formicidae: Formicinae) is distributed in tropical and subtropical regions of Afro-tropical, Palaearctic, Oriental, and Indo-Australia, with its diversity peaking in the Afrotropic regions [1] *Lepisiota integra* ants with long legs and large bodies have been shown to dominate in places with warm and dry climates [2]. In Asian countries like India and Pakistan, it has been reported from subtropical and tropical locations [3].

*Lepisiota integra* [4] are found in various parts of Asian countries like India and Pakistan [5]. It has been reported in India from Himachal Pradesh, Madhya Pradesh, Meghalaya, Punjab, and Uttarakhand [3]. This small—to medium-sized ant species has been reported from various habitats, including forests and open areas. The distribution of *Lepisiota integra* in India has been restricted to North and Central India since its discovery from Pachmarhi, Madhya Pradesh [4]. Its distribution in India was recently updated, with the species predominating in Himachal Pradesh, found in seven different locations, and Jammu and Kashmir reported from two locations, Manda and Mansar [3].

During field work for ants in Kerala, the authors came across a previously unrecorded morphotype that matched the characters of *Lepisiota integra*. Although this species has been present in India for about 130 years, it has not been documented in the southern states or from the Western Ghats. This report marks the first recorded occurrence of *Lepisiota integra* in Kerala.

**Materials and Methods****Study area**

The Shankumugham Beach situated near the Trivandrum International Airport on Thiruvananthapuram's western side is an area of tourist attraction in Thiruvananthapuram district of Kerala, South India (8.48112950°N, 76.91237030°E). It is situated at an elevation of approximately 2 meters (7 feet) above sea level. The average rainfall in Kerala during 2023 was recorded to be 2890 mm. The average annual soil temperature in this area was 32 °C and the annual air temperature was 31.8 °C. The study area had extensive anthropogenic disturbances.

**Sampling technique**

The specimens were collected using active sampling from the coastal area of Shankumugham, approximately 50 meters away from the seashore, during 2023. Ants were abundant on the ground and tree trunks of the study sites throughout all seasons. Specimens were preserved in

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1.5 ml plastic vials containing absolute alcohol. The taxonomic identification was done with the aid of keys published by [3, 6]. Morphologic study was done using an Al-micro Stereo Binocular DS-50 microscope and photographs were obtained through a Leica S9i stereo zoom microscope.

## Results

### Description

The worker specimens of *Lepisiota integra* collected had the following diagnostic characteristics. The body blackish brown, with the mandibles, antennae, and tarsi showing a brownish hue (Fig 2). The head longer than wide, with slightly convex sides and rounded posterolateral corners. The clypeus had a convex anterior margin and featured two pairs of erect setae. Eyes broadly oval, convex, and positioned at mid-length of the head. Three ocelli present, with a pair of erect setae between the lateral ocelli. The antennal scape extended to the posterior margin of the head, reaching about half of its length. The mesometanotum is strongly constricted and sits lower than the other mesosoma. The pronotum showed the presence of two standing setae, and the metanotal area distinct. The propodeum is armed with a pair of short spines, with the propodeal declivity either slanting or steep, as both variations have been observed. The petiole upright, with angular sides and a distinct emargination on both apical corners. The overall body sculpture was microreticulate to effaced, giving the body a sub-opaque appearance. Erect setae present on the head and pronotum, while the gastral setae limited to the apical segments.

### Variation

The key differences from the *Lepisiota integra* species reported by [3, 6] from subtropical regions of Northern and Central India lie in a few critical features. While the head shapes and eye structures are similar, the specimens collected from Shankumugham showed variation in propodeal declivity. Unlike the steep declivity noted by [3] or the slanting declivity reported by [6], specimens with slanting and steep declivity, were collected from the site. A colour variation was also observed in the specimens, which were blackish-brown in colour as opposed to the reddish-brown and dark brown colour recorded previously (Fig 2B). Additionally, specimens taken from the Shankumugham showed a clear emargination on both apical corners, in contrast to previous descriptions that claimed petioles had apical edges that resembled teeth (Fig 2C).

### Ecological notes

*Lepisiota integra* were found in large numbers during all four seasons during the sampling period. The ants were abundant in the collection site (Fig 3A & 3B). The ants seem to thrive on the leftovers discarded by human activities. The location is a well-known tourist destination in Kerala and also has a recently opened wedding destination which makes it an anthropogenically disturbed area. But the ants seem to be doing well with human intervention probably due to the ample quantity of food. The specimens collected were all workers.

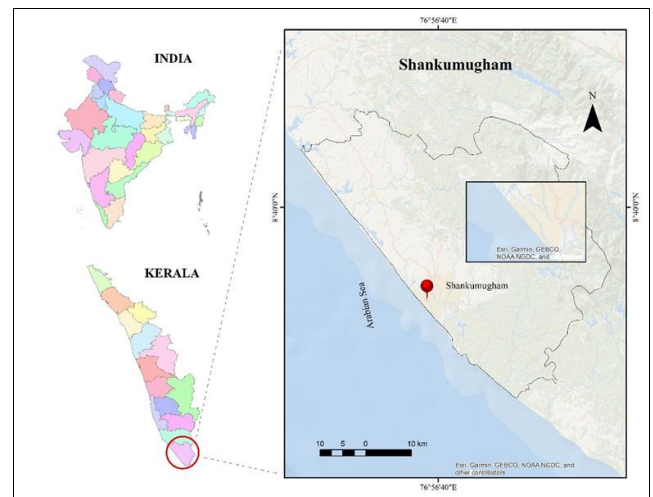
### Discussion

*Lepisiota integra* was first collected from Central India from Pachmarhi, which is a hill station located in Madhya Pradesh at an altitude of 1,067 meters above sea level [4]. Since its first discovery, it has been reported from various states in North and Central India namely Himachal Pradesh, Jammu and Kashmir, Punjab, Madhya Pradesh, Meghalaya and

Uttarakhand. There have been no reports about its occurrence in South Indian states as far as it is known. This is the first report of *Lepisiota integra* from Kerala in South India and the Western Ghats. The updated checklist of *Lepisiota integra* ants from Indian states includes reports of four *Lepisiota* species from Kerala: *Lepisiota integra fergusonii*, *Lepisiota integra opaca*, *Lepisiota integra rothneyi*, and *Lepisiota integra rothneyi wroughtonni* [7]. However, none of these species were observed in the study area and *Lepisiota integra* was the only species found in the study area.

The occurrence of *Lepisiota integra* in the tropical coastal region of Kerala holds critical implications as till date it was seen to inhabit in sub-tropical forest and non-forested areas, mostly hill stations that lie at an elevation of 500 -1457 meters above sea level. The previous reports of these species are from places like Dharamshala and Mussoorie [4] in Himachal Pradesh where cold temperature stress and disturbances limit the presence of other ants. *Lepisiota integra* from Kathua district Jammu and Kashmir was described as an opportunistic species found in subtropical dry deciduous forests 500 m above sea level and subtropical mixed pine deciduous forests 1000 m above sea level [7]. Recent reports on these species by [3] from seven locations in Himachal Pradesh and two in Jammu and Kashmir indicate its dominance in the cold climate. The other states reported like the Uttarakhand, Meghalaya and Punjab also have similar subtropical environment.

The occurrence of *Lepisiota integra* in the coastal area of Shankumugham which is in stark contrast to its previously reported habitats can be indicative of ecological and biogeographical implications like range expansion, climate change or other ecological indications.



**Fig 1:** Map of India showing location of Shankumugham in Thiruvananthapuram district, Kerala.



**Fig 2:** Worker; *Lepisiota integra* (Forel, 1894) [4] A- Head, frontal view, B- Body, dorsal view, C- Body, lateral view



**Fig 3:** Workers of *Lepisiota integra* (Forel, 1894)<sup>[4]</sup> A- nesting beneath a stone pillar, B- foraging in *Terminalia catappa*

updated checklist of the ants of India with their specific distributions in Indian states (Hymenoptera, Formicidae). Zookeys. 2016;2016(551):1-83.

### Conclusion

The occurrence of *Lepisiota integra* in the Thiruvananthapuram coast suggests a potential expansion of its known geographical range, indicating that it can adapt to a wider range of environmental conditions. This also points towards better climate adaptability and ecological flexibility displayed by these ants. Additional studies in this field may provide greater insights into the ants' dispersal strategies and the potential roles they may be fulfilling in the coastal surroundings. Further research is required to determine whether these ants have established new interactions with the local tropical flora and fauna in this area and whether they have a beneficial, neutral or detrimental impact on the local ecosystem. The present discovery of *Lepisiota integra* for the Thiruvananthapuram coast encourages further investigation into why the species was not previously detected in the tropical zone of India, as well as its ecological impact.

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