



Original Article

First record of land flatworm *Dolichoplana striata* Moseley, 1877 from Bhiwandi, Maharashtra, India

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Abstract

Planaria, a category of flatworm, has emerged as a captivating topic for zootaxonomists investigating biological phenomena, especially regeneration. Land planaria belong to the phylum Platyhelminthes and encompass approximately 900 species that have been recognized and documented globally; however, there is a scarcity of records from countries such as India. We have observed and subsequently identified a distinctive species of land flatworm, taxonomically designated as *Dolichoplana striata*, in the Asma complex area of Bhiwandi, Maharashtra, India, which was initially described by Moseley in 1877. Mobile photography was conducted without disturbing the organisms, and measurements in centimeters (total length and diameter) were recorded, while morphological characteristics were meticulously examined and compared with existing records for species identification. The light olive-brown body, creeping sole, and the presence of four distinctly visible dark stripes on the dorsal side suggest that it may belong to the genus *Dolichoplana* and species *striata*. This highly predatory flatworm preys on small mollusks and insects, earthworms, and exhibits cannibalistic behavior as well. Most current literature indicates that *Dolichoplana striata* is predominantly found in European nations, with minimal references to its occurrence in India. Therefore, we considered it essential to document the presence of this species, which could motivate the biological community in the country to recognize and study this worm within the realm of biological sciences.

Keywords: Flatworm, *Planaria*, *Dolichoplana striata*, cannibalistic, predaceous worm, Maharashtra, Bhiwandi, India

Introduction

During a visit to the Asma complex area in Bhiwandi city, characterized by dense vegetation, particularly during the monsoon season, on the 18th of August, 2025, we encountered a total of four specimens of terrestrial flatworms, specifically a rare type of land planaria known as *Dolichoplana striata*. These specimens were observed creeping along a wall and land covered in moist moss, a bryophyte. Photographic images were taken using a mobile phone, ensuring that the animals were not disturbed, and a common thread was employed to measure their total length and width. This thread was subsequently brought to the laboratory, where final measurements were taken using a ruler in centimeters. One large specimen was recorded at approximately 20 cm in length and 0.5 mm in thickness (Fig. 1). The second specimen measured about 7 cm in length and 0.3 cm in thickness (Fig. 2). The third specimen was observed resting on the moist, moss-covered wall, its body enveloped in a thick layer of slime (Fig. 3), while the fourth was noted in a typical signature pose (Fig. 4).

The land flatworm consists of 910 species that belong to the phylum Platyhelminthes (Diagram 1), typically inhabiting tropical and temperate woodlands, and requiring moist soil for their sustenance (Sluys, 2016). These organisms are acoelomate, have dorsoventrally flat soft body can grow to about 3 to 50 cm in length and 0.2 to 0.5 cm in width (Nikolay et al 2025). They are devoid of respiratory or circulatory systems, a skeleton, or an anus. The heads of many land planarians are either expanded in a lunate shape or taper to a blunt point. Eye spots may be present on the head. Their coloration varies from greenish-grey to brown, often featuring dark narrow stripes on the dorsal side (Nikolay et al 2025).

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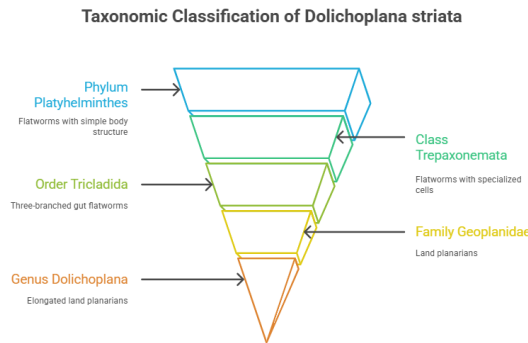


Diagram 1 Taxonomic classification of *Dolichoplana striata*

Due to blind sac body pattern their mouth is also functions as an anus, is located near the mid-body on the ventral surface. A protruding muscular plicate pharynx acts as a feeding organ and is connected to a three-branched intestine (Esser 1981). The space between the organs is filled with parenchyma, and both circular and longitudinal muscles are present. They have a nervous system which consist of cerebral ganglion functions as a brain, providing innervation to a ladder-like nervous system. The elimination of fluid waste is carried out through a rudimentary protonephridial system (Esser 1981).

Due to their photo-negative behavior during daylight and their need for high humidity, land planarians favor dark, cool, and moist environments found beneath objects like rocks, logs, debris, or shrubs, as well as on the soil surface after significant rainfall. Although they can inhabit caves, their presence in rural areas is uncommon. Their movement and feeding activities primarily take place at night. Maintaining high humidity is crucial for their survival, as they can only withstand desiccation if the loss of water does not surpass 45 percent of their body weight. Land planarians are most prevalent during the spring and fall seasons (Choate and Dunn, 2024).

Fragmentation is the most preferred method of reproduction occurs primarily at the posterior end. The lateral margins constrict roughly 1 centimeter from the tip of the tail. Fractionation takes place when the posterior fragment attaches to the substrate while the parent worm retracts. The posterior fragment becomes immediately motile, and within a span of 7 to 10 days, a lightly pigmented head starts to develop. Each month, 1 to 2 fragments are released.

Eggs are bright red in color and are laid within cocoons measuring between 0.6 and 9.7 cm. The cocoons darken to black within 24 hours. Planarians typically emerge after about 21 days.

Land planarians consume earthworms, slugs, insect larvae, and even other planarians. They detect their prey using chemoreceptors situated in a single ciliated pit beneath the head or within a ciliated ventral groove. Prey that struggle are secured to the substrate and ensnared in the slimy secretions produced by the planarian. The pharynx extends from the mouth into the prey, allowing for ingestion. The food is broken down into small particles

before entering the gastrovascular cavity. Epithelial cells then engulf these food particles in an amoeboid manner, forming food vacuoles. Planarians can store food within their digestive epithelium and are capable of surviving for several weeks by gradually reducing their size without nourishment. When their reserves are depleted, they can metabolize their own tissues, including reproductive tissue, for sustenance.

Other animals seldom consume land planarians, as their surface secretions seem unpalatable, if not poisonous. Protozoans such as flagellates, ciliates, sporozoans, and nematodes have been identified within land planarians. Due to their cannibalistic tendencies, land planarians might pose a threat to themselves.

Planarians are aggressive predators of earthworms, with two species, *Bipalium kewense* and *Dolichoplana striata* Moseley, identified as nuisances in earthworm rearing beds in the southern United States (Hyman, 1951). Additionally, two other flatworm species, *Artioposthia triangulata* and *Geoplana sanguinea*, were unintentionally introduced to Ireland and England. These species have been reported to have the potential to eliminate entire earthworm populations on agricultural lands. In greenhouse settings, although some collectors worry that flatworms could damage plants, they are mostly seen as harmless.

The combination of a terrestrial habitat, an elongated shape, a narrow and inconspicuous head, along with a noticeable lateral eyespots near the front (fig. 4 (A & B) and 5 (C & D)), indicates that the land worm we observed definitely belongs to the family Geoplanidae; Rhynchoderminae (Jones, 2005; Sluys et al. 2009; De Luna and Bolls 2023). Its relatively large size, very elongated and flattened body with a moderately wide creeping sole, and the presence of four clearly visible dark stripes on the dorsal side suggest that it might fit into the genus *Dolichoplana* Moseley, 1877 (Jones, 2005; BopCo 2020). In terms of overall appearance (with a light olive-brown body featuring four dark stripes, where the two middle stripes are narrower than the others, and the lateral stripes are more prominently marked, while the ventral side is cream-colored with a pale grey creeping sole that has a slightly darker grey fine midline (De Luna & Boll, 2023)), our specimen closely resembles representatives of *Dolichoplana striata* Moseley, 1877. *Dolichoplana striata* can be recognized by its distinctive

external features (Álvarez-Presas et al. 2014; De Luna & Boll, 2023).

Despite a thorough search of the literature, this species has not been documented in Bhiwandi city, Maharashtra, India. Our finding is clearly the first for the country. The Zoological survey of India (Whitehouse, 1918) has provided detailed records of various species such as *Bipalium*, *Pelmatopelana*, *Dolichoplana*, and *Cotyloplana* from different regions of India, but there is no mention of this particular species.

Dolichoplana striata originates from the Indo-Malayan region (Jones, 2005; Sluys, 2016). The first record in Europe was found in Ireland (Anderson, 1986). Subsequently, this species was identified in Belgium, Jersey, Germany, the United Kingdom, Spain, and Italy (Jones, 2005; Álvarez-Presas et al., 2014; Mori et al., 2022;

Thunnissen et al., 2022), as well as in Austria, the Czech Republic, Finland, Norway, Poland, and Portugal (BopCo, 2020). Over the past five years, the number of *Dolichoplana striata* records has significantly increased in various parts of the world, particularly in Italy (Grozeva et al. 2013; Simov et al., 2012; Langourov et al., 2023), suggesting that this species requires more attention in the future. These invasive planarians need to be monitored regularly since they can spread quickly through the trade of exotic plants (Simov et al., 2025).

The presence of *Dolichoplana striata* in Bhiwandi city could be particularly interesting for the scientific community. It offers an opportunity to study its distribution throughout the city, its biology, and ecological role, and it can serve as a model organism for animal-based research, especially in the area of regeneration.



Fig.1 *Dolichoplana striata*- specimen 1 observed at Asma complex, Bhiwandi



Fig.2 *Dolichoplana striata*- specimen 2



Fig.3 *Dolichoplana striata*- specimen 3 coated with sticky mucus



Fig.4 *Dolichoplana striata*- specimen 4 resting in signature pose



Fig.5. *Dolichoplana striata* A-Ventral flat creeping sole B-inconspicuous head and 4 dark stripes

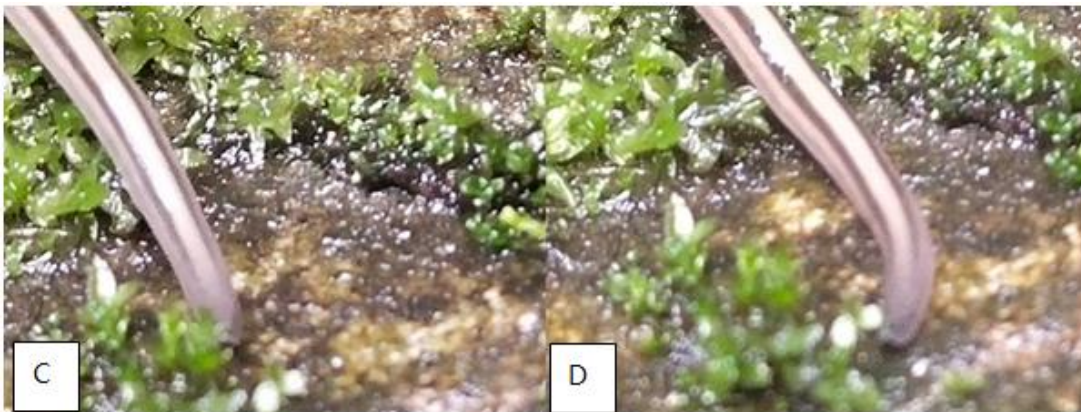


Fig.6. *Dolichoplana striata* C and D showing presence of eyespots

Conclusion

The present study documents the first recorded occurrence of *Dolichoplana striata* Moseley, 1877 in Bhiwandi, Maharashtra, India, thereby contributing a significant addition to the limited records of terrestrial flatworms from the country. The specimens observed displayed all the characteristic morphological features of *D. striata*, including an elongated, flattened body, a pale olive-brown coloration with four distinct dorsal stripes, a well-defined creeping sole, and conspicuous lateral eyespots.

This finding is noteworthy not only because the species has been predominantly reported from European countries in recent decades, but also because its detection in India highlights the possibility of its wider, yet

undocumented, distribution across the subcontinent. Given the species' known predatory behavior, invasive potential, and ability to disperse through horticultural trade, its presence in Bhiwandi warrants continued monitoring and further ecological assessment.

The record provides an important baseline for future research on the biology, distribution, ecological role, and potential invasive impact of *D. striata* in India. It also underscores the need for more systematic surveys of terrestrial flatworm fauna across diverse habitats in the region. This first report may stimulate increased scientific attention toward these understudied invertebrates and promote further exploration into their taxonomy, behavior, and environmental significance.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper

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