

First Documentation of Bipalium Species in Eastern Vidarbha, Maharashtra, India: A Potential Threat to Local Biodiversity

Ashish Suresh Gadwe

Manoharbai Patel College of Arts, Commerce and Science, Deori, Gondia, Maharashtra (India)

Email: [profgadwe\[at\]gmail.com](mailto:profgadwe[at]gmail.com)

Abstract: Land planarians, particularly the hammerhead flatworms subfamily Bipaliinae, are remarkable creatures known for their distinctive size, color, and head shape. This study presents the first documentation of the Bipalium species in the Eastern Vidarbha region of Maharashtra, India. The observed Bipalium species bears a close resemblance to *B. bengalensis*, but further morphological, anatomical, histological, and molecular analyses are needed for accurate identification. The presence of Bipalium, an invasive species that feeds on beneficial soil animals like earthworms, poses a potential threat to local biodiversity. This study underscores the need for increased awareness and further research into the ecology of this species.

Keywords: Bipalium, Deori, Gondia, Invasive species, Land Planarians, Vidarbha region

1. Introduction

The phylum Platyhelminthes contains flatworms known as turbellarians, which are free-living. They can be found in fresh water, marine, and damp soil. The name Turbellaria was given by Ehrenberg in 1831, refers to the disturbances (turbellae) caused in water by beating of their cilia. Turbellarians have limited economic value. Land flatworms are transported with soil and pot plants between continents and frequently become invasive [1] [2]. Land flatworms are carnivores, so they could pose a threat to the native soil fauna in the regions they invade. With only 822 documented species globally, terrestrial planarians are a very species-poor group of animals [3] [4] [5] [6].

In this group of Asiatic triclads, around 160 species were previously classified under the name *Bipalium* Stimpson, 1857. Though, 60% of them are only identifiable by their exterior physical characteristics [7] [8] [9] [10]. For the purpose of identifying the species of triclad planarians, the copulatory apparatus must be anatomically and histologically described using specimens that are fully sexually mature [11]. Due to a variety of factors, such as their limited range, nocturnal habits, and physical resemblance to earthworms, this group has likewise received little research attention. Consequently, many of the bipaliid species mentioned in classical literature could not be correctly recognised.

Von Graff [12] [13], Whitehouse [14], and De Beauchamp [15] conducted the bulk of the research on the Indian bipaliid land planarian fauna. With the exception of a few pioneers such as Johri [16], Sharma and Sharma [17], Rout and Ghose [18], and Ramkrishna and Chauhan [19], systematic research on this group has not been done in India since independence. Three unidentified *Diversibipalium* spp. from India were described together with a checklist of 27 known species that was published by Kawakatsu and Jayashankar [20]. This list of Indian Bipaliids includes genera, *Bipalium*, *Humbertium*, *Novibipalium* and

Diversibipalium with their distribution. Other than few studies by Selvamurugan & Bharti, [21], Bhakat, [22], and Selvamurugan, et al. [23], no other noteworthy reports on Bipalium are currently available, particularly from the Maharashtra (India). In this paper, author recorded first time the sighting of *Bipalium* species in Deori Town of Gondia district of Vidarbha region Maharashtra (India).

2. Materials and Methods

Gondia is located on the easternmost boundary of the Vidarbha region of the Maharashtra state of India. It is considered as a rice bowl of Vidarbha. As Gondia district is situated near the Navegaon - Nagzira corridor, flora and fauna of the Gondia district is rich. One of the tahasil of Gondia is 'Deori' (21.0657° N, 80.3680° E) where the Bipalium species is first reported. The specimen was photographed with the help of Mobile camera on 20th March 2022 crawling on the wall near the bushes. Specimen was not collected or preserved. The genus *Bipalium* is identified according to the basic keys available in the literature.

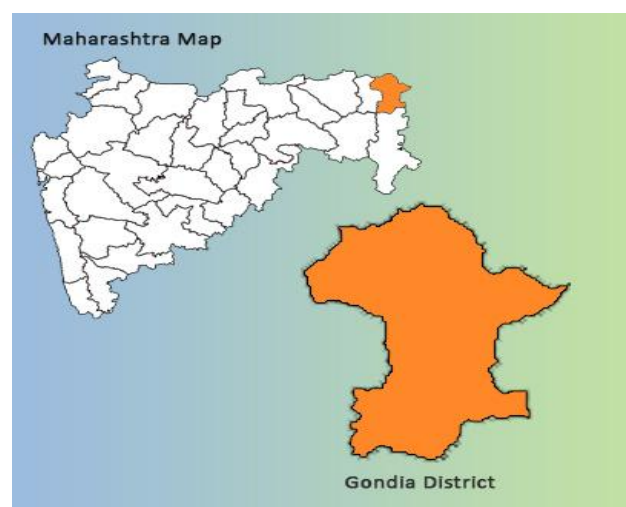


Figure 1: Map of Gondia District (Image source: <https://www.maharashtratourism.gov.in/-/gondia>)

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3. Results and Discussion

Table 1: Systematic classification of *Bipalium*

Kingdom	Animalia
Phylum	Platyhelminthes
Group	Rhabditomorpha
Class	Turbellaria
Order	Tricladida
Sub - order	Continenticola
Family	Geoplanidae
Subfamily	Bipaliinae
Genus	<i>Bipalium</i>

Due to the unique shape of the head area, *Bipalium* is frequently referred to as "arrowhead worm" or "hammerhead

worm". They grow best in locations with high humidity and are hidden beneath shrubs, rocks, logs, debris, or in dark, cool places that are also moist. After a strong rain, they can also be found on the soil's surface [24]. *Bipalium* is a prolific predator of the earthworms [25]. It hunts its prey vigorously, follows the mucus trails left by earthworms, and can catch them in their tunnels [26]. When preyed upon, it may consume earthworms that are 55 times its own mass [27]. It has no known predator, as is common with other invasive species, and tests on salamanders and snakes have shown that putative native predators do not eat it [28]. Since the surface secretions of land planarians appear to be unpleasant, if not harmful, other animals rarely eat them. The cannibalistic propensity of land planarians makes them potentially their own worst enemies [29].



Figure 2: Photographs of *Bipalium* sp. taken in its natural habitat at Deori (Gondia)

In Maharashtra, Quadros [24] reported occurrence of *Bipalium* first time in IIT Mumbai campus. Apart from this no real report on sighting of this animal in Maharashtra available. In the present study the specimen was initially observed by author in the year 2021 during the monsoon season on a wall close to a potted plant, but unfortunately no photographs were taken. In the pre - monsoon season of year 2022, it is again observed on the wall of house near bushes but at different place. This time few photographs of animal were manage to obtain, but the collection of specimen was not possible due to heavy rainfall.

Animal was appeared to be 45 mm long and 9 mm wide. The colour of the dorsal side was dark black. The head area was semi - circular which is a special feature of all the *Bipalium* species. As far as body colouration is concern, the observed, *Bipalium* species closely resembles with *Bipalium univittatum*, Grub 1866, reported by Selvamurugan and Bharti [21] in the hill station Periyakallar, Valparai, Coimbatore district of Tamil Nadu. But the body length of *B. univittatum* is much shorter as compared to sighted specimen. The specimen has striking resemblance with *Bipalium bengalensis*, a recently reported species by Bhakat [22]. *B. bengalensis* has dark black body coloration and measures 45 mm in length and 10 mm in width. So on prima facie it appears that the species found in Deori is *B. bengalensis*, but for confirmation further investigation is required.

4. Conclusion

Bipalium is an invasive animal. It is considered as potential threat to local fauna. Its appearance in the regions of Maharashtra is a threat to local biodiversity. Lack of awareness about its ecology is a worrying sign. The current study is the first to document the presence of *Bipalium*, a

type of land planarian, in the Vidarbha region of Maharashtra, India. It is very courageous to conclude on the basis of morphological evidences that the observed *Bipalium* specimen is *B. bengalensis*. Therefore, for proper identification, histological and molecular analysis combined with external morphology is required.

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