https://doi.org/10.33451/florafauna.v32i1pp23-30
FLORA AND FAUNA ISSN 2456 - 9364 (Online)
2026 Vol. 32 No.1 PP 23-30 ISSN 0971 - 6920 (Print)

Diversity of land snail from Satara district of Maharashtra state, India

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Received **:** 18.03.2026; ***Revised*** **:** 18.04.2026; ***Accepted*** : 08.05.2026

How to cite : Nandakumar SS, Sangram SV. Diversity of land snail from Satara district of Maharashtra state, India. *Flora and Fauna* 2026. 32(1) : 23-30

ABSTRACT

The present study conducted in the Satara district from July 2022 to May 2024 reported 24 species of land snail, which represent land snail diversity in the Satara district. All reported species belong to 18 genera, which were distributed among the 11 families of land snail. The satara district is confronting various threats due to anthropogenic activities including habitat destruction, intentional burning of grassland, and cutting big trees and therefore relative abundance of the land snail is low. Therefore, immediate conservation actions are necessary to be performed and specific attention must be paid over restoration of open areas with fast growing plants and control over intentional burning of grassland.

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KEY WORDS : Biodiversity, Mollusca, Western Ghats.

Introduction

Phylum Mollusca is the second largest animal phylum, comprising an enormous variety of morphologically and ecologically disparate taxa. It ranks among the most studied invertebrates as a result of its evolutionary success, while it is also one of the most widespread in terrestrial, freshwater, and marine ecosystems[1,6,7,16,24].

About 72% of the recorded species of land snails in this region are endemic. In view of such high levels of endemism[16]. a rapid, thorough survey has recorded 277 species and 29 varieties of land snails, representing 64 genera and 23 families, indicating a high degree of taxonomic richness[9,18,23].

Land snails are sensitive bioindicators of habitats with high ecological value and hence are of conservation significance. Poor mobility and habitat specificity make land snails excellent for the precise delineation of localized biodiversity hotspots, which may offer better resolution than vertebrate-based assessments of these areas[3,17].However, terrestrial molluscs are increasingly threatened by both climatic and anthropogenic stresses. Changes in rainfall patterns, temperature increase and extended dry periods have been associated with increased juvenile mortality and limited dispersion, which enhance extinction risk[4,12,20,26,27].Human activities, including pollution, habitat destruction, overcollection, invasive species introductions, urbanization, intensification of agriculture, and infrastructure development, further increase the vulnerability of the populations of land snails[3,19,25].

Against this background, the present study conducted a systematic and extensive survey of land snail diversity in the Satara district of Maharashtra, contributing to regional biodiversity assessments and informing conservation strategies.

ACKNOWLEDGEMENTS : We are grateful to the Maharashtra Forest Department for providing the necessary permits (MSSB/Desk-5/Research/855.2022-23 and Desk-22(8)/WL/Research/CR-61(21-22)/ 3486/20-22). We thank Hon. Principal, Vice-Principal and the staff of the Department of Zoology, Sadguru Gadage Maharaj College, Karad for their support during this study. We also thank Omkar Yadav and Amrut Bhosale for their constant support and valuable guidance throughout this study. We would like to express our gratitude towards Mayur Adagale for his help during the field work. We are thankful to Tarun Karmakar and Pritha Day (NCBS) for their assistance with registering the specimens.

TABLE-1 : Checklist of Land Snail Species Present in Satara District

	Family	Genus and Species	Distribution in Satara District
1	Cyclophoridae	*Cyclophorus altivagus*	Mahabaleshwar,Satara, Wai, Patan
2		*Theobaldius tristis*	Patan, Satara
3	Ariophantidae	*Ariophanta bajadera*	Mahabaleshwar, Patan, Jaoli, Satara
4		*Ariophanta belangeri*	Mahabaleshwar, Patan, Wai, Jaoli, Satara, Karad, Phaltan
5		*Ariophanta intumesence*	Mahabaleshwar, Patan, Wai, Jaoli, Satara
6		*Tanychlamys indica*	Mahabaleshwar, Patan, Jaoli, Satara, Wai, Karad, Phaltan, Man, Khatav, Koregoan
7		*Tanychlamys pedina*	Wai
8		*Tanychlamys neherensis*	Satara, Khatav
9		*Mariaella dussumieri*	Mahabaleshwar, Patan, Jaoli, Satara
10	Camaenidae	*Chloritis propinqua*	Mahabaleshwar, Patan, Jaoli, Satara, Wai, Koregoan
11		*Trachiacrassi costata*	Satara, Wai
12	Subulinidae	*Subulina octona*	Mahabaleshwar, Patan, Jaoli, Khatav, Man
13		*Glessula arthuri*	Mahabaleshwar, Patan, Satara
14		*Glessula chessoni*	Mahabaleshwar, Satara, Koregoan
15		*Glessula hebes*	Mahabaleshwar, Satara, Wai
16		*Glessula lyrata*	Mahabaleshwar, Patan, Satara
17		*Zootecus insularis*	Khanadala, Phalatan, Khatav, Man
18	Succineidae	*Succinea collina*	Mahabaleshwar, Patan, Satara
19		*Succinea raoi*	Mahabaleshwar, Patan, Satara
20	Pomatiidae	*Cyclotopsis seminstrata*	Jaoli, Satara, Wai
21	Cerastidae	*Rachis punctatus*	Phaltan, Khatav, Man, Koregoan
22	Helicarionidae	*Eurychlymus platychyms*	Mahabaleshwar, Patan, Jaoli, Satara, Wai
23		*Satiellade khanensis*	Mahabaleshwar, Satara
24	Achantinidae	*Lissachatina fulica*	Patan, Satara, Wai
25	Veronicellidae	*Laevicaulis alte*	Mahabaleshwar, Patan, Jaoli, Satara, Wai, Khatav, Koregoan, Man, Karad, Khandala
26	Streptaxidae	*Haploptychius sahyadriensis*	Patan

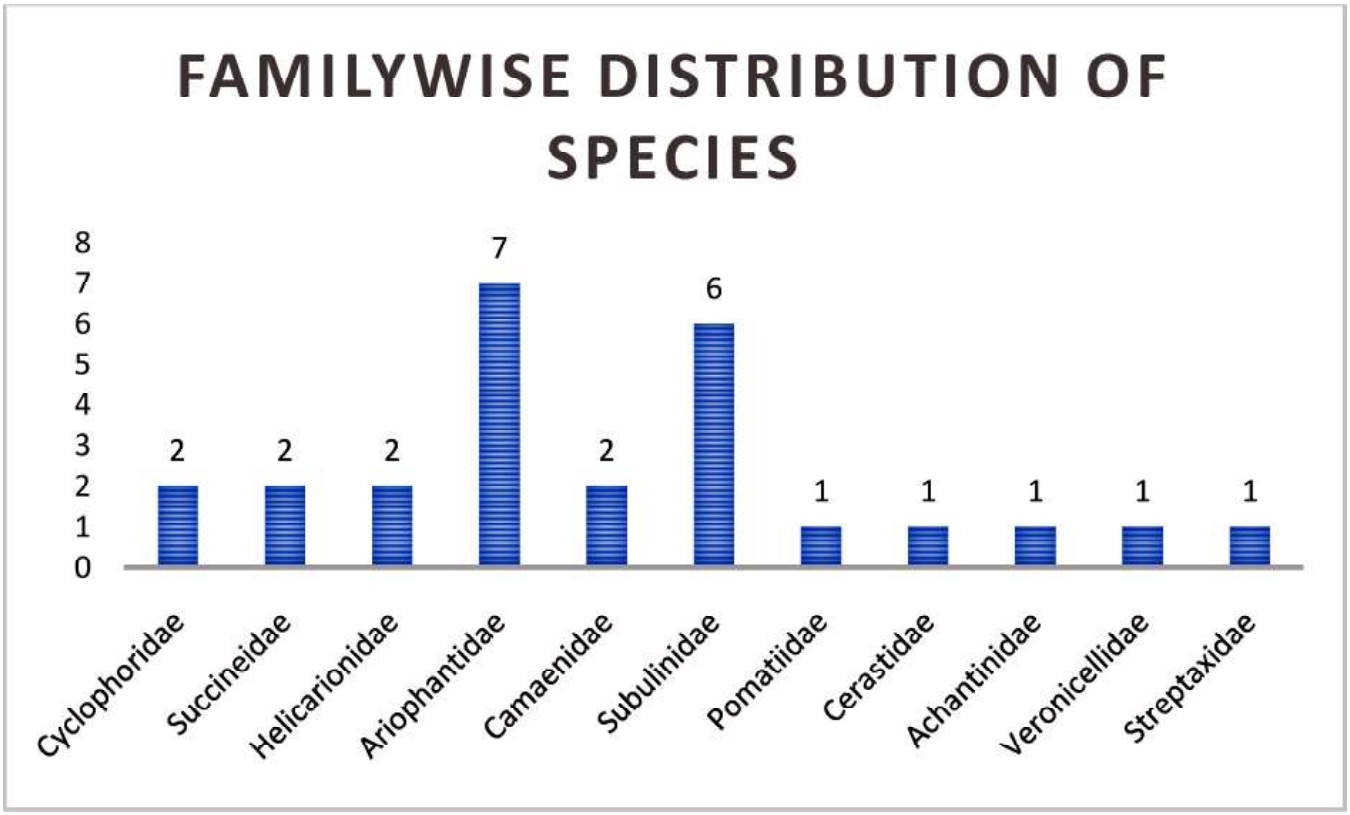

Fig. 1 : Familywise Distribution of Land Snail

Materials and Methods

The present study was conducted in Satara district, located at western parts of the Maharashtra at 17.6925° N to 74.0183° E and covers 10,480 sq kms and makes up 3% of Maharashtra's total area. It has 11 Tehsils and divided into Western and Eastern zones. The climate is characterized by monsoon, winter, and summer seasons. The annual maximum mean temperature is 36.8ÚC and annual minimum mean temperature is 14.4ÚC. Satara district experiences the majority of its annual rainfall during the Southwest monsoon season, which lasts from June to September. The district has four rainfall zones: high, medium, low, and drought-prone. The high rainfall zone includes the Mahabaleshwar, Patan, and Jaoli Tehsils; the medium rainfall zone includes the Satara and Wai Tehsils; the low rainfall zone includes the Khandala, Koregaon, and Karad Tehsils; and the drought-prone zone includes the Phaltan, Khatav, and Man Tehsils. The average elevation in Satara district is 600 to 1200 m AMSL. Satara district has 1524 sq km actual forested area distributed in four talukas *viz;* Mahabaleshwar, Jaoli, Patan, Wai (western part) and the Koyna Wildlife Sanctuary area. Koyna Wildlife Sanctuary, covering around 423 sq km, this sanctuary is part of the Sahyadri Tiger Reserve and is recognized as a world heritage site.

A survey of land snail was conducted from June 2022 to May 2025. The conducted survey was done by visual encountered method[15]. Active searches were made at selected sites. The searches made by walking across roads, gardens, forested area (exclude protected area), agricultural lands, old temples, wall of buildings and hotels etc. The observations were done in time zone of 18.30 to 22.30 Hr in torchlight. One or two voucher specimens (per species) were collected for identification. All voucher species encountered were identified up to species level using identification key and their morphological characters of shell were studied using images of the type material [5,13,14,23] and recent taxonomic literature [2,8,11,21-23].

Result

The richness of land snails varies across habitats, totalling 26 species from 11 families. Diversity among the families ranges from those having a single genus and species to as many as six genera and six species. The family Ariophantidae was the most dominant with 7 species, followed by Subulinidae, which had 6 species. Families Camaenidae, Cyclophoridae, Succineidae, and Helicarionidae each had 2 species. In contrast, Pomatiidae, Cerastidae, Achatinidae, Veronicellidae, and Streptaxidae each contributed one species.

Conclusion

This study shows that land snail diversity changes

Fig. 2 : Species of Land Snail

Mariaella dussumieri

Chloritis propinqua

Trachia crassicostata

Subulina octona

Glessula arthuri

Glessula chessoni

Glessula hebes

Glessula lyrata

Fig. 3 : Species of Land Snail

Succinea collina

Succinea raoi

Cyclotopsis semistriata

Rachis punctatus

Eurychlymus platychlymus

Satiella dekhanensis

Lissachatina fulica

Haploptycus sahyadriensis

Fig. 4 : Species of Land Snail

from one habitat to another. A total of 26 species belonging to 11 families were recorded, indicating a good level of species richness. Some families were represented by many species, while others had only one, showing an uneven distribution of land snails. The family Ariophantidae was the most common, followed by Subulinidae, suggesting that these groups are better adapted to the available habitats. A few families had moderate representation, whereas several were present with only a single species, possibly due to narrow habitat requirements or lower population sizes. Overall, the results highlight the influence of habitat conditions on land snail diversity and provide useful information for future biodiversity and conservation studies.

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