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Description of the Speciesbradybaena Plectotropis Living in the Vicinity of the Naryn River

Gaibnazarova Feruza Pardabaevna[1], Khakberdiyeva Khilola[2]
[1]Associate Professor of Biology Republic of Uzbekistan, Gulistan State University
[2]Teacher of the "Distance Education" Department, Gulistan State University

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ABSTRACT

Objective: *This study aimed to investigate the terrestrial malacofauna in the Naryn River region, with a specific focus on Bradybaena plectotropis in Grigorievskoe Gorge, Kyrgyzstan, to enhance understanding of its ecological roles and biological features.* ***Methods:*** *Field surveys and anatomical analyses were conducted in August 2024, covering diverse biotopes across Grigorievskoe Gorge and Boom Gorge. Forty specimens were collected, documented, and examined for morphological and reproductive characteristics to determine ecological preferences and habitat distribution.* ***Results:*** *The study identified Bradybaena plectotropis as a dominant species in the region, demonstrating significant morphological adaptations and ecological versatility. Its roles in soil formation, organic matter decomposition, and trophic chains underscore its ecological importance. Additionally, its presence across varied biotopes highlights its adaptability and widespread distribution.* ***Novelty:*** *This research provides the first comprehensive faunistic and anatomical study of Bradybaena plectotropis in the Naryn River region, offering valuable insights into its taxonomy, ecological roles, and conservation relevance in Kyrgyzstan's mountainous ecosystem.*

INTRODUCTION

In recent years, faunistic studies have regained prominence within zoological research in Russian science, driven by the urgent need to preserve biodiversity amidst the ongoing degradation of natural ecosystems [1], [2], [3], [4]. Despite the growing attention, the study of mollusks in the Naryn River region remains fragmented and incomplete [5], [6], [7], [8]. This highlights the significance of investigating land mollusk fauna in various regions, a field of modern malacology critical for understanding biodiversity and ecological dynamics [9], [10], [11].

The Middle Naryn area exemplifies the need for such studies, as knowledge of the terrestrial mollusk fauna and their ecological roles has been scarce, with prior work limited to isolated species observations [12], [13], [14], [15]. Addressing this gap, the study of terrestrial gastropods in the region becomes essential, not only to document species but also to analyze their ecological and biological features [16], [17], [18].

The importance of terrestrial mollusks extends beyond biodiversity documentation. These organisms play vital roles in the ecosystems of the Tien Shan-Alai mountain systems in Kyrgyzstan, acting as decomposers, soil formers, and crucial links in trophic chains [19], [20]. Their association with specific environmental conditions and their limited mobility make them ideal subjects for studying genetic, ecological, and

microevolutionary processes [6], [13], [15]. Furthermore, their role in the circulation of matter and energy in mountain biocenoses underscores their ecological significance [11], [18].

Grigorievskoe Gorge, located near Lake Issyk-Kul, presents a unique and diverse environment with distinct landscape belts and ecological habitats. This study focuses on *Bradybaena plectotropis*, a gastropod species found in the region, to enhance our understanding of its distribution, ecological roles, and biological characteristics [4], [9], [14]. This research contributes to broader efforts to understand and conserve the unique biodiversity of Kyrgyzstan's mountainous regions [17], [18], [19], [20].

RESEARCH METHOD

This study employed a combination of field surveys and anatomical examinations to investigate the terrestrial malacofauna in the mountain systems of Kyrgyzstan, specifically focusing on the Naryn River region. Fieldwork was conducted in Grigorievskoe Gorge (Chon Ak-Suu), located on the northern shore of Lake Issyk-Kul, as well as in the nearby Boom Gorge. Sampling sites were selected to represent diverse biotopes, including high-mountain lakes, alpine meadows, and lower valley areas, ensuring coverage of the region's varied landscape belts.

Specimens of terrestrial mollusks, particularly *Bradybaena plectotropis* (Martens), were collected during field trips on August 7–8, 2024. The geographic coordinates of the sampling locations were precisely recorded using GPS devices to document their distribution. A total of 40 specimens were obtained from various biotopes, including Grigorievskoe Gorge (42.810084° N, 77.454465° E) and Boom Gorge (42°30′00″ N, 74°35′00″ E).

The collected specimens underwent detailed morphological and anatomical analysis. External shell characteristics, such as shape, color, and dimensions, were examined under a stereomicroscope. Internal structures, including the reproductive anatomy, were dissected and described to identify and understand species-specific features. Measurements of the reproductive organs, such as the penis, epiphallus, and oviduct, were recorded to facilitate comparisons with existing taxonomic descriptions.

This methodological approach enabled the identification of *Bradybaena plectotropis* and provided insights into its ecological preferences and distribution patterns in the studied regions. The study further analyzed the role of these mollusks in mountain biocenoses, emphasizing their ecological and evolutionary significance.

RESULTS AND DISCUSSION

The investigation into the terrestrial mollusks of the Chong-Ak-Suu Gorge (Grigorievskoe Gorge) has yielded critical insights into the species diversity and ecological roles of these organisms. A focal species in this study, *Bradybaena plectotropis* (Martens), was identified in various biotopes within the vicinity of the Naryn River, specifically in areas such as the Boom Gorge and Chong-Ak-Suu Gorge. The species was

thoroughly described morphologically and anatomically, with detailed observations of its shell, internal structures, and reproductive system.

Morphological and Anatomical Features

The shell of *Bradybaena plectotropis* exhibits significant variations, ranging from low-conical to lenticular shapes, with a conical or rounded whorl.

Figure 1. a,b-Sink

Its distinctive keel on the periphery and a coloration pattern of gray, horny, or brown with spiral ribbons highlights its adaptation to specific environmental conditions. The detailed examination of the internal structure, including the reproductive system, revealed notable characteristics such as a relatively small penis, extensive mucous glands, and a cylindrical seminal receptacle duct.

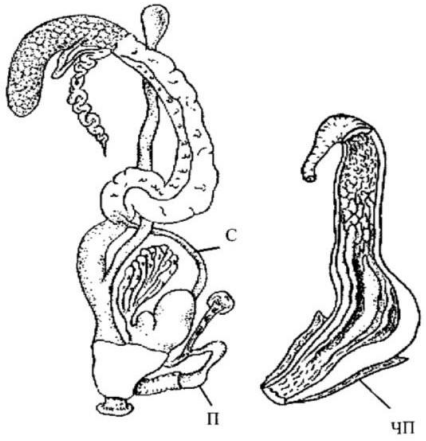

Figure 2. a,b**-***Bradybaena plectotropis*re productive tract and internal structure of the penis

These findings contribute valuable data to the taxonomy and reproductive biology of this species, enhancing our understanding of gastropod physiology.

Ecological Observations

The study highlighted the adaptability of *Bradybaena plectotropis*, which inhabits a wide range of biotopes within the surveyed areas. Its role in trophic chains, soil formation, and organic matter decomposition underlines its ecological importance. Additionally, the mollusk's function as an intermediate host for helminths and its impact as an agricultural pest further emphasize its significance in both natural and human-influenced ecosystems.

Distribution and Habitat

The surveyed sites, including the Boom Gorge and the three high-altitude lakes in the Chong-Ak-Suu Gorge, provided a comprehensive representation of diverse landscape belts. The gradual slope of the gorge, transitioning from forests to alpine meadows, offers a variety of microhabitats that support mollusk populations. The study recorded 40 specimens of *Bradybaena plectotropis* across multiple locations, confirming its widespread distribution in the region.

Relevance to Biodiversity Conservation

This research underscores the critical need for faunistic studies in preserving biodiversity. By identifying and characterizing terrestrial gastropods in the Naryn River region, the study contributes to a better understanding of mountain ecosystem dynamics and informs conservation strategies. The mollusk's ecological and biological traits, coupled with its narrow habitat range, make it a valuable model for studying microevolutionary processes and population ecology.

In conclusion, the study of *Bradybaena plectotropis* in the Chong-Ak-Suu Gorge not only enriches malacological knowledge but also highlights the species' pivotal role in maintaining ecological balance. Further research is encouraged to explore its interactions within broader ecosystem contexts and to monitor the impacts of environmental changes on its populations.

CONCLUSION

Fundamental Finding : The ecological roles of *Bradybaena plectotropis* underline its importance in maintaining the balance of mountain ecosystems and inform biodiversity conservation strategies. Additionally, its restricted habitat range and close environmental associations make it a valuable model for studying population ecology and microevolutionary processes in the context of environmental changes. **Implication :** The ecological roles of *Bradybaena plectotropis* underline its importance in maintaining the balance of mountain ecosystems and inform biodiversity conservation strategies. Additionally, its restricted habitat range and close environmental associations make it a valuable model for studying population ecology and microevolutionary processes in the context of environmental changes. **Limitation :** The study is limited by its narrow focus on a single species and geographically restricted sampling sites. This scope may not

capture the full diversity or dynamics of the terrestrial mollusk fauna in the region, potentially overlooking broader ecological interactions and biodiversity. **Future Research :** Future studies should broaden the scope to include multiple species and more extensive sampling across varied geographic and temporal scales. Long-term monitoring and ecosystem-wide analyses are recommended to assess the impacts of environmental changes on mollusk populations and to uncover broader ecological and evolutionary patterns.

REFERENCES

[1] F. Gaibnazarova and A. Pazilov, "Conchological variability of terrestrial mollusks Nanosignals of gibbulinopsis of Turkestan and Zarafshan ridges," in *Proceedings of the III International Scientific Conference on Zoological Studies of the Regions of Russia and Adjacent Territories*, Nizhny Novgorod, Russia, 2014.

[2] F. Gaibnazarova, N. Ruzikulova, N. Safarova, K. Khakberdiyeva, and U. Musabekov, "Conchological variation of widely common species of terrestrial mollusks of Uzbekistan," *E3S Web of Conferences*, vol. 494, no. AEES2023, 2024. [Online]. Available: https://doi.org/10.1051/e3sconf/202449401021

[3] F. Gaibnazarova, "Faunistic spectrum of terraneous mollusks of Uzbekistan and bordering territories," *E3S Web of Conferences*, vol. 392, no. RSE-II-2023, pp. 02040, 2023. [Online]. Available: https://doi.org/10.1051/e3sconf/202339202040

[4] A. Pazilov, F. Gaibnazarova, and M. Saidov, *Patterns of vertical distribution of terrestrial mollusks of Uzbekistan and adjacent territories*. Tashkent: Fan, 2014.

[5] A. Pazilov and F. Gaibnazarova, "Geographical variability of conchological features of the terrestrial mollusk *Pseudonapaeus aptechus*," in *Proceedings of the VIII International Scientific and Practical Conference*, Krasnodar, Russia, 2014, pp. 128–130.

[6] F. Gaibnazarova, "The nature of the variability of the signs of the sexual apparatus of *Pseudonapaeus albiplicata* from the Chatkal, Kuraminsky Ridges," *Guliston Davlat Axborotnomasi University*, vol. 3, 2015, p. 21.

[7] F. Gaibnazarova and A. Pazilov, "On the fauna of terrestrial mollusks (gastropods, Pulmonata) of the Kugitangtau ridge," in *Proceedings of the Conference on Ecology, Evolution, and Systematics of Animals*, 2012, pp. 13–16.

[8] F. Gaibnazarova and A. Pazilov, "Conchological variability of terrestrial mollusks Nanosignals of gibbulinopsis of Turkestan and Zarafshan ridges," in *Proceedings of the III International Scientific Conference on Zoological Studies of the Regions of Russia and Adjacent Territories*, Nizhny Novgorod, Russia, 2014.

[9] A. Pazilov, F. Gaibnazarova, and H. Karimova, "Complexes of terrestrial mollusks in various biotopes of the Zarafshan ridge," *JOURNALNX - Interdisciplinary Peer-Reviewed Journal*, June 2020.

[10] A. Pazilov, F. Gaibnazarova, and H. Karimova, "Alien species *Monacha carthusiana* (Mollusks, gastropods, pulmonary) as a new intermediate host of the nematode *Cystocaulus ocreatus* in Uzbekistan," *Naukoviy Visnik Uzhhorod Universitetu, Seriya Biologiya*, vol. 40, 2016, pp. 83–85.

[11] F. Gaibnazarova, "The nature of the variability of the signs of the sexual apparatus of *Pseudonapaeus albiplicata* from the Chatkal and Kuramin ranges," *Biological Sciences of Kazakhstan*, vol. 3, 2014.

[12] F. Gaibnazarova, "Biological diversity of terrestrial mollusks of the Surkhan-Sherabad valley and its surrounding mountain ranges," *Naukovi Zapiski Ternopil National Pedagogical University*, vol. 2 (51), spec. issue, 2012, pp. 54–57.

[13] A. Pazilov and F. Gaibnazarova, "Conchological variability of the terrestrial mollusk signature of gibbulinopsis from the Baysuntau, Kugitangtau, and Babatag ridges," in *Proceedings of the International Conference on Ecology, Evolution, and Systematics of Animals*, Ryazan, 2012.

[14] A. Pazilov and F. Gaibnazarova, "Species composition and variability of terrestrial mollusks of the genus *Cochlicopa* of Uzbekistan and adjacent territories," in *Proceedings of the 5th International Conference on Ecological Features of Biological Diversity*, Hadjent, 2013, pp. 96–97.

[15] A. Pazilov and F. Gaibnazarova, "Population variability of conchological features of the terrestrial mollusk *Pseudonapaeus secalin* from the Turkestan ridge," in *Proceedings of the VI International Scientific and Practical Conference on Theory and Practice of Current Research*, Krasnodar, 2014, pp. 45–47.

[16] F. Gaibnazarova and A. Pazilov, "Conchological variability of terrestrial mollusk Nanosignals of gibbulinopsis in Turkestan and Zarafshan ridges," in *Proceedings of the III International Scientific Conference on Zoological Studies of the Regions of Russia and Adjacent Territories*, Nizhny Novgorod, 2014, pp. 35–37.

[17] F. Gaibnazarova, "A variety of dry shellfish is common in the regions of Uzbekistan and adjacent territories," *Annals of the Romanian Society for Cell Biology*, vol. 25, no. 6, pp. 2828–2834, 2024.

[18] F. Gaibnazarova, "Distribution of land snail by vertical zones and biotopes of *Pseudonapaeus* species in Fergana, Chatkal, and Kurama mountain ranges," *European Science Review*, no. 1–2, pp. 3–4, 2016.

[19] A. Pazilov, F. Gaibnazarova, and M. Saidov, *Vertical distribution patterns of terrestrial mollusks of Uzbekistan and adjacent territories*. Tashkent: Fan, 2014.

[20] F. Gaibnazarova, "Geographical variability of conchological features of the terrestrial mollusk *Pseudonapaeus aptechus*," in *Proceedings of the VIII International Scientific and Practical Conference on Modern Science: Trends in Development*, 2014, pp. 128–130.

***Gaibnazarova Feruza Pardabaevna (Corresponding Author)**
Associate Professor of Biology Republic of Uzbekistan, Gulistan State University
Email: feruz.bio@yandex.ru

Khakberdiyeva Khilola
Teacher of the "Distance Education" Department, Gulistan State University