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Research Article

STUDIES ON THE DIVERSITY OF WATER BUGS (INSECTA: HEMIPTERA) FROM RAJAJI NATIONAL PARK, DEHRADUN, UTTARAKHAND, INDIA

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ABSTRACT

The diversity of water bugs (Insecta: Hemiptera: Heteroptera) from Rajaji National Park, Dehradun, Uttrakhand, India was studied. Ten species across nine genera belonging to four families are identified. All of the species are documented for the first time in this sanctuary. Among them, three species representing three genera and three families are newly recorded from the state of Uttarakhand. Detailed distributional records for each species are provided, along with color photographs.

Keywords: Rajaji National Park, Aquatic hemiptera, Uttrakhand, Dehradun, Distribution.

INTRODUCTION

Rajaji National Park spans 820.42 square kilometers across the Pauri Garhwal, Dehradun, and Haridwar districts of State Uttarakhand. It is situated in between 29°15' to 30°31' N, 77°52' to 78°22' E and at altitude 250–1100 m in north India (Joshi & Dixit 2012). It was created in 1983 to protect the habitat of the Asian elephant. At present, it is known as the Shivalik Elephant Reserve. Uttarakhand is a state with significant ecological and climatic diversity. It is situated on the southern slopes of the Himalayas and its climate and vegetation vary widely with elevation. The state's vegetation primarily consists of alpine forests and tropical rainforests, and it is home to many rare plant and animal species. Additionally, Uttarakhand is the origin of two major rivers, the Ganga and the Yamuna, which emerge from glaciers in the region. The state features six national parks and six wildlife sanctuaries. Among them Rajaji National Park covers parts of the Shivalik range and the Indo-Gangetic plains, providing a habitat for various rare and endangered species, as well as many migratory birds. A total number of 6,058 species of Hemiptera have been documented in India, with 478 species reported from the state of Uttarakhand (Praveen *et al*, 2023). More recently, Saha and Bal (2010) reported a total of 45 species from 26 genera across 11 families in this state. Significant research on the terrestrial biodiversity of Rajaji National Park has been conducted by Panwar and Mishra (1994). Samweel and Nazir (2013) focused on monitoring and conserving aquatic insects in the Song and Suswa rivers within the park. However, no previous studies have reported on the diversity of the aquatic bug species in the park. This research article aims to address this gap by exploring the diversity of aquatic bugs in Rajaji National Park.

MATERIALS AND METHODS

All of the aquatic hemiptera specimens studied in this research were obtained from a backlog collection housed in the National Zoological Collection of the Zoological Survey of India (ZSI). All specimens were collected by T.P. Soota in 1965 from various locations within the Dehradun district of Rajaji National Park. Species identification was conducted using relevant literature (Distant 1903, 1906, 1910a and 1910b, Basu and Subramanian 2017, Basu *et al*. 2018, Andersen 1995, Thirumalai 2002a, 2007). Photographs of the specimens will be taken using the built-in camera of a Leica M205A stereo binocular microscope.

RESULTS AND DISCUSSION

A total of 10 species across 9 genera from 4 families have been identified from Rajaji National Park. Among these, 3 species representing 3 genera from 3 different families are newly recorded for the state of Uttarakhand. The family Gerridae exhibits the highest diversity, followed by the family Belostomatidae. Detailed information on the distribution of species is provided in Table 1.

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Table1. List of Species of Water bugs reported from Rajaji National Park along with their distribution in India. (*species newly reported from the state Uttarakhand).

Sl No	Family	Name of Species	Distribution
1	Gerridae	*Aquarius adelaides* (Dohrn, 1860)	India: Uttrakhand, Andhra Pradesh, Bihar, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere: Bangladesh, China, Indonesia, Myanmar, Nepal, Philippines, Sri Lanka, Thailand and Vietnam.
2	Gerridae	*Cylindrostethus productus* (Spinola, 1837)	India: Uttrakhand, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Tamil Nadu, Uttar Pradesh and West Bengal. Elsewhere: Sri Lanka.
3.	Gerridae	*Ptilomera agriodes* Schmidt, 1926*	India: Uttrakhand, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra and Tamil Nadu.
4	Gerridae	*Limnogonus nitidus (Mayr., 1865)*	India: Uttrakhand, Andaman & Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Delhi, Karnataka, Kerala, Madhya Pradesh, Odisha, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. Elsewhere: China, Indonesia, Malaysia, Maldives Islands, Myanmar, Nepal, Singapore, Sri Lanka, Thailand and Vietnam.
5	Nepidae	*Ranatra filiformis Fabricius,* 1790	India: Uttrakhand, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. Elsewhere: Australia, Nepal and Sri Lanka.
6.	Nepidae	*Laccotrephes ruber* (Linnaeus, 1764)	India: Uttrakhand, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Nagaland, Odisha, Punjab, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. Elsewhere: China, Japan, Nepal, Pakistan and Taiwan.
7.	Belostomatidae	*Diplonychus rusticus* (Fabricius, 1781)	India: Uttrakhand, Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. Elsewhere: Australia, Austria, China, Formosa, Indonesia, Japan, Malay Peninsula, Myanmar, New Zealand, Philippines, Sri Lanka, Thailand and New Guinea.
8.	Belostomatidae	*Diplonychus molestus Dufour, 1863**	India: Uttrakhand, Andhra Pradesh, Bihar, Chandigarh, Chhattisgarh, Delhi, Himachal Pradesh, Jammu & Kashmir, Kerala, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Tripura, Uttar Pradesh and West Bengal.
9.	Belostomatidae	*Lethocerus indicus* (Lepeletier and Serville, Citation1825)	India: Uttrakhand, Andaman & Nicobar Islands, Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Odisha, Puducherry, Punjab, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. Elsewhere: Indonesia, Malay Peninsula, Myanmar, Pakistan and Philippines.
10.	Micronectidae	*Micronecta haliploides* Horvath, 1904*	India, Uttrakhand, Arunachal Pradesh, Assam, Bihar, Kerala, Madhya Pradesh, Manipur, Meghalaya, Odisha, Tripura, Uttar Pradesh, and West Bengal.

Several researchers, including Distant (1906, 1910a), Hutchinson (1933, 1940), Pradhan (1950), Brooks (1951), Lunsbury (1968), Prasad (1975, 1977), and Andersen (1990 & 1993), recorded various species of water bugs from different localities that were once part of Uttar Pradesh and are now within Uttarakhand. The study of aquatic bugs from the state Uttarakhand has been carried out by Saha and Bal (2010) and reported 45 species belonging to 26 genera across 11 families. However, there have no report of Water bugs from the Rajaji National Park till now. This study focusses on the diversity of aquatic bugs in Rajaji National Park, Uttrakhand, India. It marks the first attempt to document the water bug species present in this specific national park.

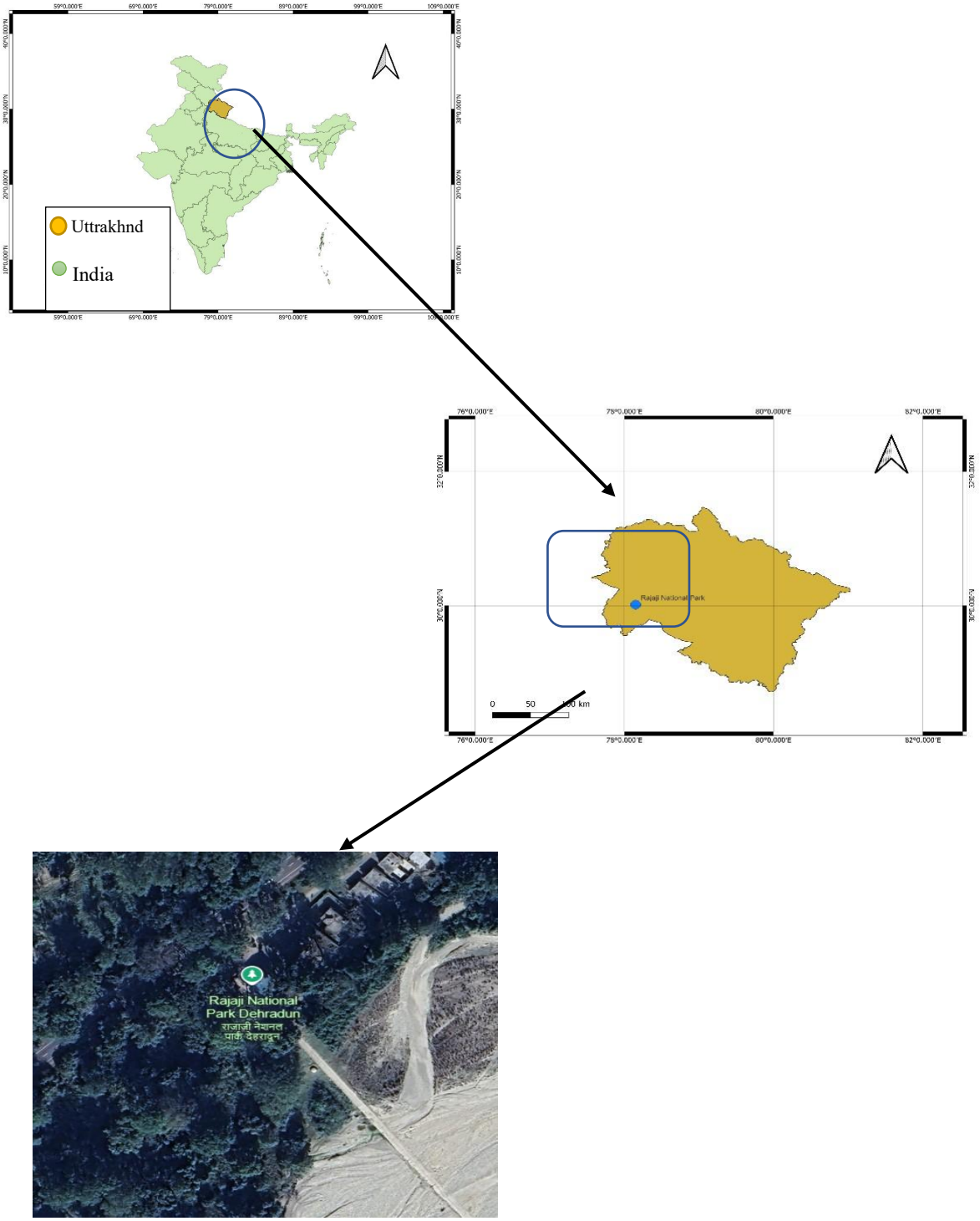

Figure 1. Location map of the Study area.

CONCLUSION

Despite the high ecological and climatic diversity in Uttarakhand, including Rajaji National Park, the aquatic insect fauna remains poorly documented as limited number of studies have been carried out so far. More investigation is needed to establish a comprehensive faunal profile of the order Hemiptera, particularly the aquatic bugs, in this region. Therefore, extensive surveys should be conducted in Rajaji National Park and other areas of Uttarakhand for better understanding of the true aquatic and semi-aquatic hemipteran diversity.

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL

Not applicable

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AI TOOL DECLARATION

The authors declares that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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