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DIVERSITY, DISTRIBUTION AND HABITAT ECOLOGY OF AMPHIBIANS IN SEONI DISTRICT, MADHYA PRADESH, INDIA

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ABSTRACT:- Amphibians are ecologically important vertebrates that play a significant role in maintaining ecosystem stability and biodiversity. Due to their permeable skin, complex life cycles and dependence on aquatic and terrestrial environments, they are considered sensitive indicators of environmental changes. The present study focuses on the diversity, distribution and habitat ecology of amphibians in Seoni District, Madhya Pradesh, India. The region represents diverse ecological habitats, including tropical forests, agricultural fields, freshwater ponds, wetlands, seasonal streams and riverine ecosystems. The amphibians was represented by 06 species belonging to 6 genera of 3 families and 3 orders from Seoni district, Madhya Pradesh, India, during 2025 to 2026. Considering number of species in each family Bufonids with 1 species, Dicroglossids 4 species, and Rhacophorids 1species. The highest number of amphibian species was recorded from Seoni & Kurai tehsil (6 species), while the lowest number of species was observed in Kurai tehsil (1 species). Status of amphibians shows that 4 species are abundant, 1 are common and 1 species are rare in the study sites. The study is expected to contribute to the baseline documentation of amphibian biodiversity in Seoni District and provide useful information for future ecological monitoring and conservation planning. Particular emphasis is placed on the importance of conserving freshwater habitats and forest ecosystems for the long-term survival of amphibian populations.

KEYWORDS:- Amphibian Diversity, Anura, Frogs, Toads, Habitat Ecology, Seoni, Madhya Pradesh, Biodiversity, Conservation.

INTRODUCTION:-

Amphibians represent an important group of vertebrates occupying aquatic, terrestrial and semi-aquatic ecosystems. The class Amphibia comprises three living orders: Anura (frogs and toads), Caudata (salamanders and newts) and Gymnophiona (caecilians). Most amphibians exhibit a biphasic life cycle in which the larval stage is generally aquatic, while adults may occupy terrestrial, arboreal or semi-aquatic habitats. Their physiological characteristics, especially permeable skin and dependence on suitable moisture conditions, make them sensitive to environmental disturbances.

Amphibians perform several ecological functions, including regulation of insect populations, nutrient cycling and maintenance of food-web relationships. They also serve as important prey organisms for reptiles, birds and mammals.

The growing attention of populace in cities and the sizeable pace of development and growth of city areas have led to the emergence of unique prerequisites forming populations and communities, which range notably from the natural. With the emergence of cutting-edge cities is related emergence of the urban ecosystems. The species composition, structure of populations and communities in these ecosystems is usually now not random, however is a reflection of objective strategies in particular conditions in urban areas (Vershinin, 1997).

India possesses considerable amphibian diversity. According to the Zoological Survey of India's 2024 checklist, 454 amphibian species were recorded nationally, including 18 species listed for Madhya Pradesh (Dinesh et al., 2024).

Central India contains a variety of forest ecosystems, wetlands, rivers and agricultural landscapes that provide suitable habitats for amphibian communities. Seoni District is an important part of this ecological region and includes forest habitats associated with the Pench landscape.

Despite the ecological significance of amphibians, detailed district-level documentation remains important for understanding their diversity and distribution.

Therefore, the present study aims to develop a scientific account of amphibian diversity, habitat preferences, seasonal occurrence and conservation requirements in Seoni District.

OBJECTIVES OF THE STUDY

- To document the diversity of amphibians in Seoni District.
- To identify and classify amphibian species recorded during field investigations.
- To examine their distribution across different ecological habitats.
- To study seasonal variations in amphibian occurrence.
- To evaluate the influence of habitat characteristics on amphibian distribution.
- To identify potential environmental threats affecting amphibian populations.
- To suggest appropriate conservation strategies for amphibian biodiversity.

REVIEW OF LITERATURE:-

Invariable component of the city ecosystems are the amphibians and reptiles. They occur in a range of terrestrial and aquatic habitats and therefore suffer in various degrees the impact of human activity. This leads to discount in their diversity, compared to herbal environments and adjustments in the shape of their populations and communities. Scientific publications from latest years endorse possibilities for the use of amphibians and reptiles as a mannequin animal organization in complex urban research (Vershinin, 1997; Bolshakov *et al.*, 2001; Ficetola & Debernardi, 2004; Jellinek *et al.*, 2004).

The various topography, geographic location, excessive rainfall and humidity have probable to be supported to the survival of several species of amphibians in the Western Ghats and the Eastern Himalayas (Andrews *et al.*, 2005). Amphibian of India comprises of about 405 species (Dinesh *et al.*, 2017), then again the specific number of species has now not been known considering the fact that new species of a amphibians are being discovered. The amphibian fauna of British India was first published by using Boulenger (1890). In India, several taxonomic revisions and new species have been described by Biju and Bossuyt (2009) [8], Vallan *et al.*(2010), Biju *et al.* (2014), Dahanukar *et al.* (2016), Garg and Biju (2017), and Padhye *et al.* (2015 and 2017).

MATERIALS AND METHODS

Study Area

The study is designated for the period 2025–2026. Field observations should be organized according to the actual survey dates and available field records. Seoni District is situated in the southern part of Madhya Pradesh, Central India, and forms an important geographical unit of the Satpura Plateau region. The district headquarters is located at Seoni town. Geographically, the district extends approximately between 21°36′ to 22°57′ North latitude and 79°19′ to 80°17′ East longitude. The district is surrounded by Jabalpur and Narsinghpur districts towards the north and northwest, Mandla district towards the northeast, Balaghat district towards the east, Chhindwara district towards the west and Maharashtra towards the south. Seoni has a number of natural resources with the Wainganga River draining the district. Seoni district comprises seven tehsils: Seoni, Chhapara, Kurai, Keolari, Ghansor, Lakhnadon and Barghat.

Seoni is characterized by diverse natural landscapes, including hills, plateaus, valleys, forests, agricultural lands, rivers and freshwater ecosystems. These geographical features create a variety of ecological habitats suitable for different groups of terrestrial and

aquatic organisms. The district is particularly significant from the biodiversity perspective because of its association with the Satpura forest landscape and Pench Tiger Reserve. The region supports diverse flora and fauna and provides important ecological habitats for amphibians, reptiles, birds and mammals. According to the Government of Madhya Pradesh district portal, Seoni is an important forest-rich district with approximately 37% green forest area. The Wainganga River is one of its major geographical and ecological features.

Methodology:-

Amphibian surveys should be undertaken in different ecological habitats, particularly during monsoon and post-monsoon periods when many species exhibit increased activity. Field studies were primarily performed by using visits to all seven tehsils of Seoni district and to all the blanketed areas, throughout wet and dry season both in day and night. At all locations, intensive search for amphibians used to be undertaken by using visual encounters method; the fashionable technique formulated for measuring and monitoring the amphibian diversity by using IUCN/SSC-DAPTF (Crump, Heyer *et al.*, 1994). Here all possible sites such as the river bank, close to water bodies, along streams, in agricultural lands, grasslands, under leaf litter, on tree trunks, on foliages, under stones, logs, rock crevices and decaying vegetation had been searched. The looking out is made of frogs and toads the usage of torch lights for the duration of night. On each and every amphibian sighting, statistics on species, habitats, microhabitat and altitude have been recorded. All amphibians determined for the duration of the find out about were photographed and after taking morphometric measurements they are released returned into their natural habitat, as per the wellknown methods for amphibians (Crump, Heyer *et al.*, 1994). Specimen identification was made on the basis of morphometry, calls, available literature Boulenger (1890), Chanda (2002), Daniels (2005), Gururaja (2012), Inger & Dutta (1986), and with the help of other taxonomists. The nomenclatures of species were updated with the checklist by Dinesh *et al.* (2017) and Frost (2017).



RESULT AND DISCUSSION:-

The amphibian was represented by 06 species belonging to 6 genera of 3 families and 3 orders from Seoni district, Madhya Pradesh, India, during 2025 to 2026. Considering number of species in each family Bufonids with 1 species, Dicroglossids 4 species, and Rhacophorids 1species. The highest number of amphibian species was recorded from Seoni & Kurai tehsil (6 species), while the lowest number of species was observed in Kurai tehsil (1 species). Status of amphibians shows that 4 species are abundant, 1 are common and 1 species are rare in the study sites. The following checklist is provisional and should not be interpreted as a confirmed inventory of Seoni District.

Table 1: Checklist of Amphibian fauna of Seoni district with distribution, status, IUCN status and WPA- cites.

S. No.	Name of species	Common names	Location of species	Status	IUCN Red Least	WPA-cites
ORDER: ANURA (Fischer von Waldheim) FAMILY: BUFONIDAE (Gray)						
1.	*Duttaphrynus melanostictus* (Schneider1799)	Common Indian Toad	Seoni, Chhapara, Lakhnadon Kurai, Barghat and Keolari	Abundant	LC	
FAMILY: DICROGLOSSIDAE (Anderson)						
2.	*Euphlyctis cyanophlyctis* (Schneider, 1799)	Indian Skittering Frog (Indian Skipper Frog)	Seoni, Chhapara, Lakhnadon Kurai, Barghat and Keolari	Abundant	LC	Sch. IV APP.II
3.	*Minervarya agricola* (Jerdon, 1853)	Indian cricket frog	Kurai Seoni	Rare	Not Assessed	
4.	*Hoplobatrachus tigerinus* (Daudin,1802)	Indian Bull frog	Seoni, Chhapara, Lakhnadon Kurai, Barghat and Keolari	Abundant	LC	Sch. IV APP.II
5.	*Sphaerotheca breviceps* (Schneider, 1799)	Indian Burrowing Frog	Seoni, Chhapara, Lakhnadon Kurai, Barghat and Keolari	Abundant	LC	
FAMILY: RHACOPHORIDAE Hoffman						
6.	*Polypedates maculatus* (Gray,1830)	Common Indian Tree Frog (Chunam Frog)	Seoni, Kurai, Barghat	Common	LC	

Rare- species found in 1-2 tehsils, Common- species found in 3-5 tehsils and Abundant- species found in more than 4 tehsils EN- Endangered, CE- Critically Endangered, VU- Vulnerable, LC- Least Concerned, DD-Data Deficient, NT- Near Threatened. Schedules IV-Indian Wildlife (protection) Act App. II of CITES - The Conservation on International Trade in Endangered Species of Wild Flora and Fauna.

HABITAT-WISE DISTRIBUTION

Amphibian distribution is influenced by water availability, vegetation cover, temperature, humidity and breeding-site characteristics. Forest habitats may support terrestrial and arboreal amphibians, whereas agricultural landscapes and freshwater ponds may provide suitable conditions for semi-aquatic and aquatic species. Seasonal wetlands and temporary water bodies are particularly important for breeding and larval development.

ECOLOGICAL IMPORTANCE OF AMPHIBIANS

Amphibians contribute to ecosystem functioning in several ways:

- ❖ They regulate insect and other invertebrate populations.
- ❖ They provide food resources for higher trophic levels.
- ❖ They contribute to nutrient cycling.
- ❖ They serve as biological indicators of environmental quality.

- They support ecological interactions between aquatic and terrestrial ecosystems.

THREATS TO AMPHIBIAN DIVERSITY

Potential threats to amphibian populations in the study region include:

- Destruction and fragmentation of natural habitats.
- Wetland degradation and water pollution.
- Excessive application of agricultural pesticides.
- Deforestation and vegetation loss.
- Road mortality during seasonal movements.
- Changes in rainfall and climatic conditions.
- Disturbance of natural breeding habitats.

These factors require systematic assessment through long-term field monitoring.

CONSERVATION MEASURES

The following measures are recommended:

1. Protection of natural ponds, wetlands and seasonal water bodies.
2. Conservation of forest-associated freshwater habitats.
3. Reduction of pesticide application near amphibian breeding sites.
4. Public awareness programmes for local communities.
5. Regular monitoring of amphibian populations.
6. Documentation of breeding sites and seasonal migration.
7. Development of district-level amphibian biodiversity databases.

The final results of the investigation will be based on verified field observations collected during 2025–2026. The study will examine species richness, habitat-wise distribution, seasonal occurrence and relative abundance. Comparisons among forest, agricultural and wetland habitats will help identify the ecological factors influencing amphibian distribution. Prasad et al. (2020) documented 15 anuran species in Panna Tiger Reserve, Madhya Pradesh, using morphological, molecular and bioacoustic approaches. Their findings demonstrate the importance of detailed amphibian surveys in Central Indian protected areas. The present investigation may provide complementary district-level information for understanding amphibian biodiversity in the Seoni region.

CONCLUSION:-

Amphibians constitute an essential component of the biodiversity of Central India. The diverse forest, agricultural and freshwater habitats of Seoni District provide potentially suitable ecological conditions for different amphibian groups. Survey of amphibians in Seoni district concludes that the non-endemic frogs viz. *Duttaphrynus melanostictus*, *Euphlyctis cyanophlyctis*, *Hoplobatrachus tigerinus*, *Sphaerotheca breviceps* and *Polypedates maculatus* are widely distributed, well adapted and occur in all microhabitats. Environmental prerequisites and habitat of species play a necessary position in the distribution and diversity of species. Hence this survey provides baseline records and scientific records for conservation of amphibians from arid zone. Systematic field investigations and accurate species identification are essential for developing a reliable inventory of amphibian diversity in the district. The study will contribute to regional biodiversity documentation and provide a scientific basis for future conservation initiatives. Long-term monitoring of amphibian populations and protection of freshwater habitats are recommended for maintaining ecological stability.

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