Ela Foundation

Ela Journal of Forestry and Wildlife

ISSN 2319-4361
(Indexed in Google Scholar)
Volume 14 | Issue 4
October - December 2025

A quarterly scientific refereed e-Journal of Ela Foundation and Forest Department, Maharashtra for Nature Conservation through Education and Research

Listed in UGC- CARE

Grasses Of Satpura Tiger Reserve: Forage For Herbivores

Rahul Kumar Upadhyay[1*], Rakhi Nanda[2] and Richa Mishra[3]

([1] Forest Range Officer, Satpura Tiger Reserve, Madhya Pradesh, India.
[2] Field Director, Satpura Tiger Reserve, Madhya Pradesh, India.
[3] PhD, Indian Institute of Technology (BHU) Varanasi, India.
rahulupadhyay8303@gmail.com,
Forest Colony, Sohagpur, Narmadapuram, Madhya Pradesh, India. Pin code-461771).

Citation: Upadhyay Rahul Kumar, Nanda Rakhi and Mishra Richa. (2025). Grasses Of Satpura Tiger Reserve: Forage For Herbivores. *Ela Journal of Forestry and Wildlife*.14(4): 1837-1846

Date of Publication: 31 December 2025

ISSN 2319-4361

Abstract

Grasslands significantly contribute to contend against soil erosion, to regularize water regimes, to purify fertilizers and pesticides and to enrich biodiversity, sustaining life on earth. Besides its role as forage for herbivores, habitat for wildlife, both flora and fauna, conservation of land and water resources and carbon sink to alleviate greenhouse gas emissions; grasslands contribute to the attractiveness of the landscape. Grasses form the backbone of an ecosystem, supporting a sizeable population of herbivores, which in turn sustain carnivores. The Satpura Tiger Reserve (STR), part of the Satpuda-Maikal landscape in central India, is blessed with rich floral and faunal diversity, forests, wetlands and grasslands. Grassland area of this reserve accounts for 10% of the total area most of which have been developed by voluntary relocation of several villages from the core area. This study highlights the importance of grasses of STR that serve as a silent architect of its ecosystem. A total of 61 grass species, identified across the core zone of STR and the adjoining buffer area, have been listed. The checklist offers detailed information about the STR poaceae (grasses) species distribution, their edibility, lifecycle and flowering and fruiting time, that will be very useful for researchers and nature enthusiasts. To the best of our knowledge this is the first checklist of grasses for STR.

Keywords

Grasses, Grassland, Herbivores, Satpura Tiger Reserve

Introduction

Satpura Tiger Reserve (STR) is a vast protected

area within the Satpura Mountain range of the central Indian highlands eco-system. This reserve lies in the Narmadapuram, Betul and Chhindwara districts of Madhya Pradesh, India, expanding in an area of 2133.307 km^2. STR, being one of the finest landscapes of central India is blessed with rich bio-diversity, inhabiting many of the rare and endemic flora and fauna (Official Website Satpura Tiger Reserve 2025; Hora 1953). The vegetation composition, forest canopy density, varied grasslands and wetlands of STR together with its topography has created varied habitats.

Grasslands of STR, covering about 10% of the total area, play a key role in the ecological pyramid by sustaining herbivores (Official website Satpura Tiger Reserve 2025; Hora 1953; Banerjee et al 2022). They are the major asset of rich biodiversity in STR. These grasslands are the goldmines of plants that provide food to support fauna and ideal wildlife habitat for breeding, migrating, and wintering birds. These terrestrial ecosystems comprising herb and shrub vegetation (mainly non-woody plants) are maintained by fire, and grazing (Bnaerjee Banerjee et al 2022; White et al 2000; Boval and Dixon 2012). These open-air landscapes support recreational activities such as hunting by predators, wildlife-watching, and tourism, and may have sites of spiritual significance too. Grasses though overlooked, are as important as trees in recycling of greenhouse gases, restoring soil organic matter (nutrient cycling) and a very large carbon sink thus helping limit global warming (Tilman and Downing 1984; Carlier et al 2009; Roy 1984; Jha and Campbell 2025).

Poaceae (the grasses) is certainly the most successful plant family, as their extensive underground root systems enable them to regrow even after grazing and fire (Roy 1984; Jha and Campbell 2025; Rao et al. 2025; Nayi et al 2025; Linder et al 2017). Such high ecological flexibility of grasses enables them to colonize, persist and transform STRs environment to an ideal habitat for wild herbivores. Therefore, some of the prominent grasses of STR have been listed together in this study to understand and appreciate the richness of its grassland .

Materials and methods

Study Area

STR lies within the undulating ranges of Satpura hills (altitude ranging from 300 m to 1352 m above mean sea level) located between the Narmada and Tapti rivers forming a watershed area which is triangular in shape. This accounts for the rich floral and faunal diversity here. The climate here is tropical with an average rainfall of 1300-1700 mm. Vegetation in STR is composed of mainly teak forests, few sal forests (Panchmarhi hills), wetlands and open grasslands (Official website Satpura Tiger Reserve 2025; Hora 1953). Grasslands in STR are mostly developed after voluntary relocation of villages as shown in Fig. 1 (a-d). STR comprises 1339.26 km² of core zone and about 794.04 km² of buffer zone (Official website Satpura Tiger Reserve). For study, grasslands of both core and buffer zone have been selected which are shown in green patches in STR map (Fig. 2).

Grasslands in STR that have been developed after relocation (voluntary) of villages are listed in table 1. Systematic survey of these grasslands with prior permission from Field Director, STR was done from October 2024-September 2025 for sample collection. A stratified random sampling approach was used by us to monitor and collect samples from the grasslands at regular intervals of 15 days for one complete year (October 2024-September 2025) (Nayi et al 2025). Various grass species were collected especially during their flowering and fruiting season to ensure their exact identification (Fig. 3). Specimens were pressed dried and mounted on herbarium sheets (Jain and Rao 1977; Smith and Chinnappa 2015). During grass species collection, their habitat, life cycle, edibility by herbivores were noted carefully. The edibilty has been monitored by field staff for various herbivora at regular interval of 15 days. Fig. 4 shows the feeding of palatable grasses by various herbivora observed during field monitoring. Species identification was done as per the Plants of the World Online (POWO) database (POWO 2025).

Results and discussion

Field survey and identification of grasses revealed the presence of 61 prominent grass species in STR grasslands which have been documented in Table 1 (POWO 2025). Along with grass identification, other parameters such as its edibility (palatable, initially palatable or non-palatable), life cycle, flowering time and fruiting time have also been studied and mentioned here in Table 1.

Various grass species listed above are the preferred forage for herbivores found in STR such as gaur,

spotted deer (commonly known as cheetal), sambhar, swamp deer, nilgai, wild boar, etc. that cannot even exist without these extensive grasslands. The grass preference study is based on the field staff observation and literature survey (White 2000; Boval and Dixon 2012). Further, animals such as wild dogs, fox, jackal, etc. and many birds are also directly or indirectly dependent on these grasses for their food, shelter and to complete their lifecycle (White 2000; Boval and Dixon 2012; Tilman and Downing 1994; Carlier et al 2009, Gibson 2009). With increasing number of grasslands in STR, the proactive steps taken by STR management in augmentation of spotted deer *(Axis axis)* from Pench Tiger Reserve and reintroduction of swamp deer (*Rucervus duvaucelii branderi)* from Kanha Tiger Reserve in STR has shown their successful survival and increase in their population (Official website Satpura Tiger Reserve). We have collected total 61 species, out of which 59 are palatable and 2 are non palatable. Based on our field observation, palatable and initially palatable grasses preferred by particular herbivora has been mentioned in table 1. The animals often observed feeding on grasses were gaur, cheetal, sambhar, swamp deer, nilgai and wild boar. The biogeographical location of STR between Narmada and Tapti River systems forming a watershed area account to these flourishing grasslands (Official website Satpura Tiger Reserve; Hora 1953; Banerjee et al 2022). Effective grassland management practices in STR have directly benefitted the watersheds by increasing water infiltration and soil conservation (Official website Satpura Tiger Reserve). Thus, integrated resource management of both the grasslands and watersheds have led to rich floral and faunal diversity in STR.

Conclusion

This study provides a comprehensive knowledge about the prominent 61 grass species in STR, their preference by herbivores (palatable or not), their life cycle and grassland phenology. Grasslands developed from village relocation in STR reduces the biotic pressure in the reserve and serves as an ideal habitat for wildlife. This highlights the importance of grasslands in sustaining the rich bio-diversity of STR ecosystem. The detailed information about the grasses helps understand the STR grassland composition. Many grass species of this checklist are under-assessed and non-evaluated as per IUCN Norms. Regarding conservation status, *Eragrostis japonica, Eragrostis unioloides, Imperata cylindrica, Ischaemum rugosum, Saccharum spontaneum, Cenchrus pedicellatus, Echinochloa colona and Sacciolepis indica* have been classified under the Least Concern (LC) category according to the IUCN Red List (White et al 2000; Tripathi et al 2021; Swamy et al 2024; IUCN (2025)). Furthermore, this checklist serves as a guide, for frontline forest staff, learning resource for students and nature enthusiasts, supporting the ongoing conservation and management plans in STR. Regular grassland monitoring, soil and grass nutrient content sampling must be done regularly to ensure the sustainable grassland management.

Acknowledgement

The author would like to thank Shubhranjan Sen, PCCF (Wildlife) and L Krishnamurthy, APCCF (Wildlife) Madhya Pradesh for their continuous guidance and support. The authors express their gratitude to Rishibha Netam, Deputy Director STR, for required essential assistance. We also thank Chandrapal Dhurvey, Forest guard (Madai) STR and Srijan Vaishnav, Field Biologist, for collecting field data.

Author's contribution

Original idea, Survey, Data collection and analysis was done by Rahul Kumar Upadhyay. Rakhi Nanda contributed to design of the study. Richa Mishra has contributed in manuscript preparation.

References

- Satpura Tiger Reserve 2025. <https://www.satpuratigerreserve.org>
- Hora, S. L. 1953, The Satpura Hypothesis. *Science Progress* **162** (1933-41), 245-255.
- Banerjee, S. Khatri, P. K. and Banerjee, S. K. (2022) Soil and Vegetation in Pachmarhi Biosphere Reserve and Their Correlation. In: Shit P K, Adhikary P P, Bhunia G S and Sengupta D (eds) Soil Health and Environmental Sustainability. *Environmental Science and Engineering*. Springer, Cham. <https://doi.org/10.1007/978-3-031-09270-1_5>
- White, R. Murray, S. and Rohweder, M. (2000) Pilot Analysis of Global Ecosystems: Grassland Ecosystems, *World Resources Institute*, Washington D.C.
- Boval, M. and Dixon, R. M. (2012) The importance of grasslands for animal production and other functions:

a review on management and methodological progress in the tropics. *Animal* **6**(5), 748-762. <doi:10.1017/S1751731112000304>

- Tilman, D. and Downing, J. (1994) Biodiversity and stability in grasslands. *Nature* 367, 363-365. <https://doi.org/10.1038/367363a0>
- Carlier, L. Rotar, I. Vlahova, M. and Vidican, R. (2009) Importance and Functions of Grasslands. *Not Bot Horti Agrobo* **37**, 25-30. <DOI:https://doi.org/10.15835/nbha3713090>
- Gibson, D.J. (2009) Grasses and grassland ecology. Oxford university press, New York.
- Roy, G. P. (1984) Flora of India, Series -4, Grasses of Madhya Pradesh, *Botanical Survey of India*, *Government of India.*
- Jha, K. K. and Campbell, M. O'N. (2025) Intersections of Conservation Biogeography and Wildlife Management: Navigating the Anthropocene Era, *Springer Nature*, ISBN 9819501210, 9789819501212.
- Rao, R. Y. Sankaran, M. Jathanna, D. and Andheria, A. (2025) Assessing ungulate response to conservation-oriented village relocations and their associated management practices in a tiger reserve in central India, *Biodiversity and Conservation* **34,** 2905-2920.<https://doi.org/10.1007/s10531-025-03101-1>
- Nayi, T. Bhagwat, M. Saini, S. Haldikar, S. Gangurde, A. Chavan, S. (2025) A comprehensive checklist of grasses (poaceae) from Kanha Tiger Reserve, Madhya Pradesh, India. *J. Phytol. Res.* **38**(1): 121-131.
- Linder, H. Lehmann, C. Archibald, S. Osborne, C. and Richardson, D. (2017) Global grass (Poaceae) success underpinned by traits facilitating colonization, persistence, and habitat transformation. *Biol Rev* **93**(2) 1125-1144.< https://doi.org/10.1111/brv.1238>
- Jain, S. K. and Rao, R. R. (1977) A Handbook of Field and Herbarium Methods, Today & Tomorrow's Printers, New Delhi.
- Smith, B. and Chinnappa, C. (2015) Plant Collection, Identification, and Herbarium Procedures. In: Yeung E, Stasolla C, Sumner M and Huang B (eds) *Springer*, Cham. <https://doi.org/10.1007/978-3-319-19944-3_30>
- POWO 2025, *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; https://powo.science.kew.org/
- Tripathi, S. Agnihotri, P. Jaiswal, S. Yadav, R. Prasad, D. Vaishnav, V. and Husain, T. (2021). Phytogeographical Assessment of Family Poaceae Barnhart in Western Himalaya, India. *J. Biodiverse Manage Forestry.* **2020**. 1-6.
- IUCN (2025). The IUCN Red List of Threatened Species. Version 2022-2. https://www.iucnredlist.org> accessed on 15.11.2025.
- Swamy, J. Appaiah, A. and Jalander, V. (2024). Grass Species Diversity and Conservation in Shivaram Wildlife Sanctuary, Telangana, India, *Ind. J. Pure App. Biosci.* 12(2), 26-33. doi: http://dx.doi.org/10.18782/2582-2845.9080.

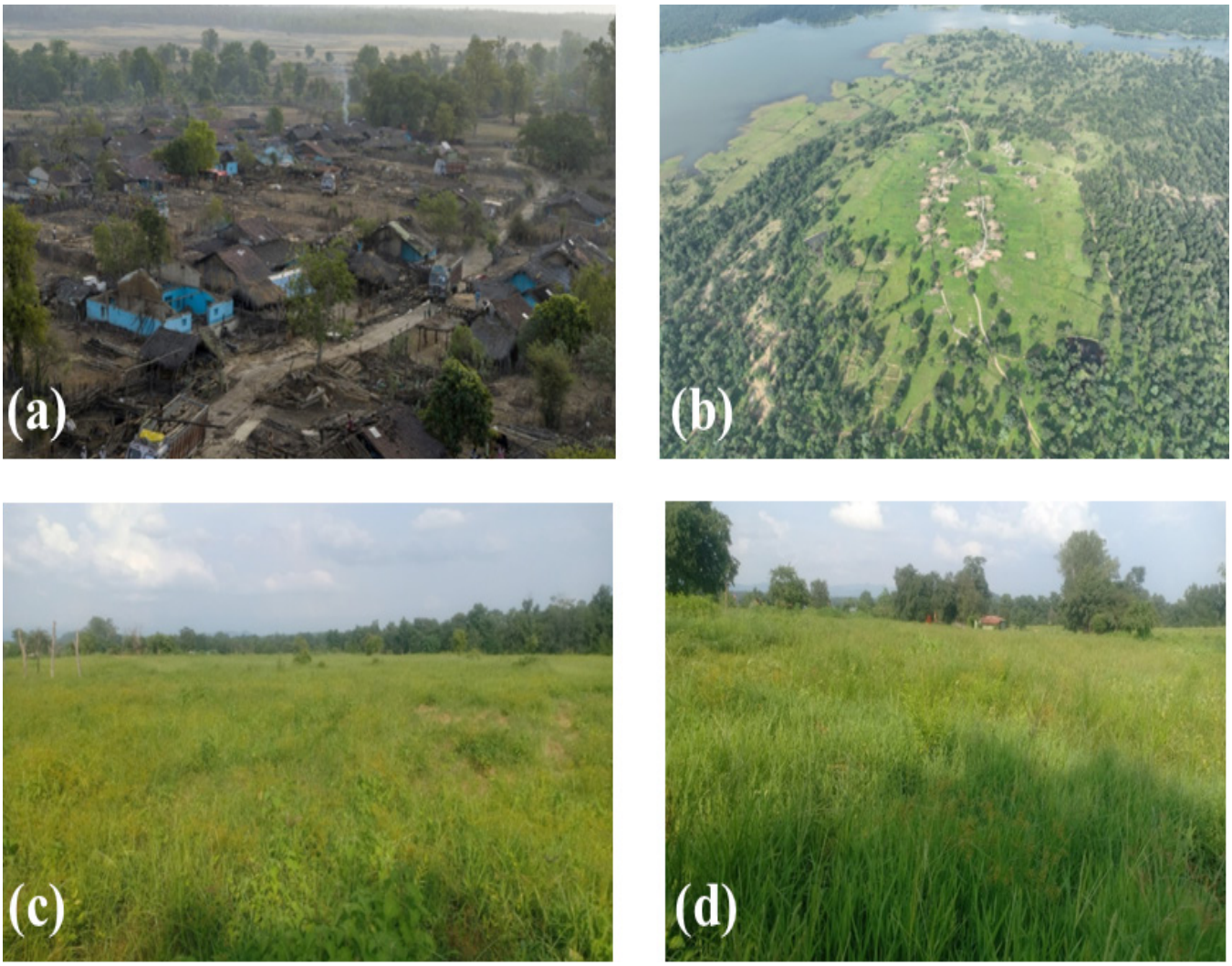


Fig.-1: Grassland development in STR (a) before village relocation, (b) after relocation, (c-d) developed grasslands

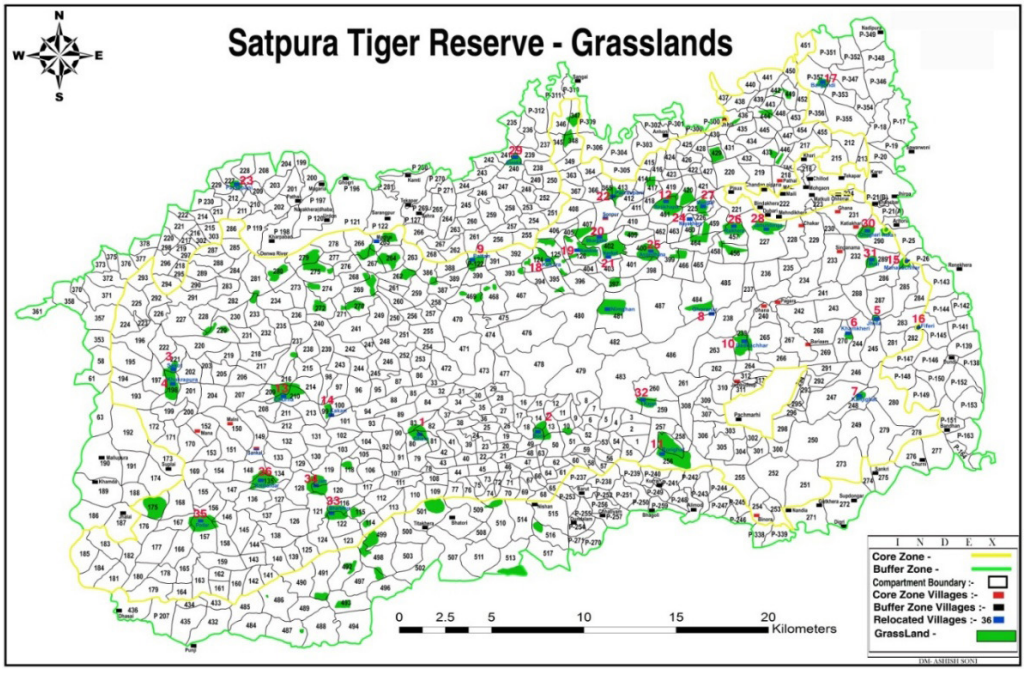


Fig.-2: Grassland map of Satpura tiger reserve (green patches signify grasslands)

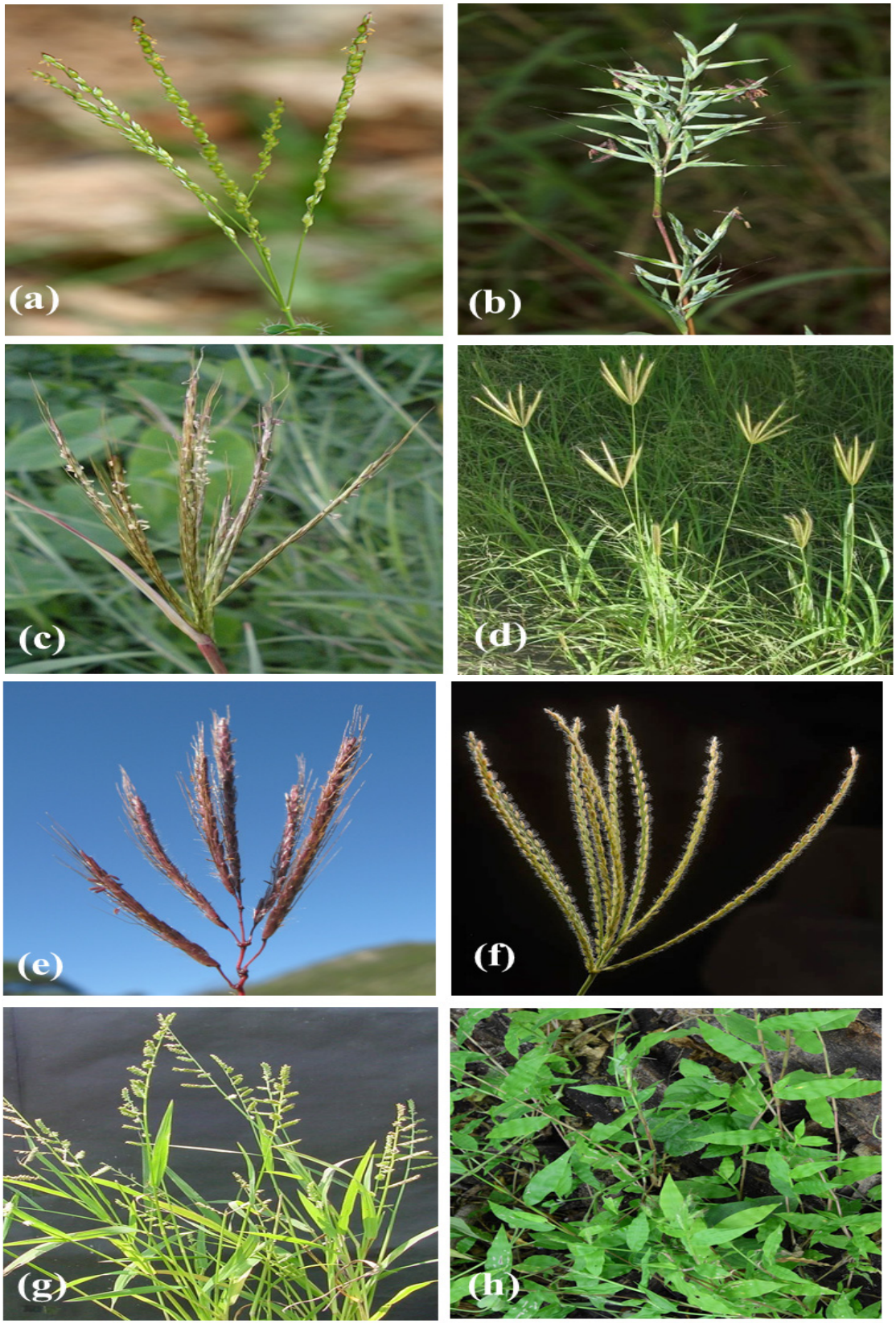


Fig.-3: (a) *Alloteropsis cimicina* (b) *Apluda mutica* (c) *Bothriochloa bladhii* (d) *Chloris virgata* (e) *Dichanthium annulatum* (f) *Digitaria bicornis* (g) *Echinochloa colona* (h) *Oplismenus burmanni.*

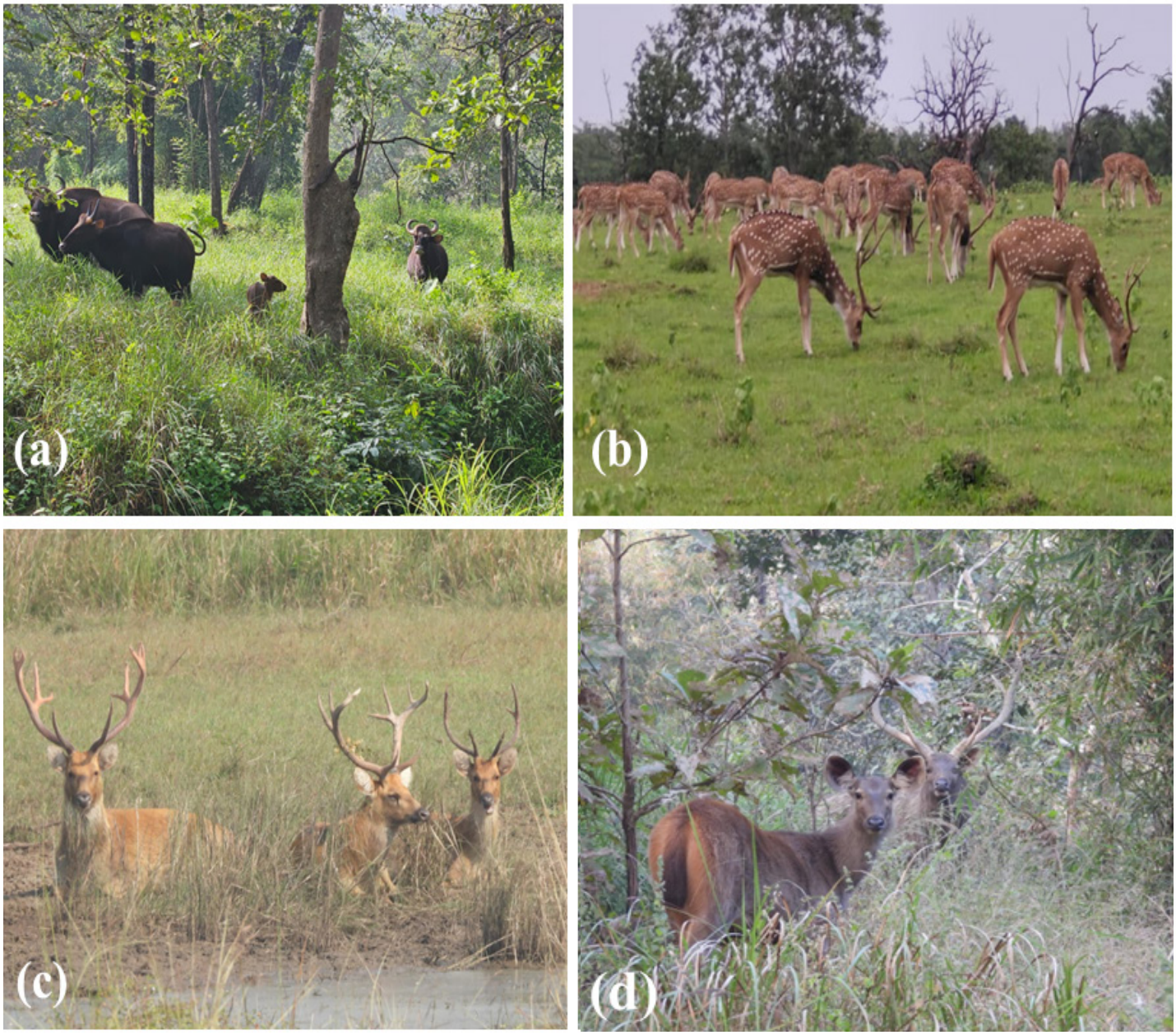


Fig.-4: Feeding of palatable grasses by (a) Gaur, (b) spotted deer, (c) Swamp deer and (d) Sambhar at STR during field monitoring.

Table 1: Grass species of STR: their edibility, life cycle and grassland phenology

S.No.	Common name	Botanical name	Edibility	Life cycle	Grassland phenology		Animal preference
					Flowering	Fruiting	
1	Summer grass/ Kira ghas	*Alloteropsis cimicina*	Initially palatable	Annual	August, September	September, October	C
2	Fulera ghas	*Apluda mutica*	Palatable	Perennial	August, october	September, november	N,C,G
3	Khadda ghas	*Aristida setacea*	Initially palatable	Perennial	September, november	October, december	N,C
4	Bansi ghas	*Arthraxon lanciofolius*	Palatable	Perennial	August, october	October, November	N,C,S
5	Chhoti dab ghas	*Arundinella pumila*	Palatable	Perennial	September, November	October, December	C,S
6	Junglee baint	*Arundo donax*	Initially palatable	Perennial	September, December	Rarely produces viable seeds	G
7	Bhainskandi/ Dhaman	*Bothriochloa bladhii*	Palatable	Perennial	July, October	October, december	C,N,G
8	Bhainskandi/ Karad ghas	*Bothriochloa intermedia*	Palatable	Perennial	July, September	September, November	C,N,G
9	Bhainskandi/ Kunta ghas	*Bothriochloa kuntzeana*	Palatable	Perennial	August, October	October, November	C,N,G
10	Bhainskandi/ Dhaman ghas	*Bothriochloa pertusa*	Palatable	Perennial	July, October	September, December	N,C,S,G
11	Deenanath grass	*Cenchrus pedicellatus*	Initially Palatable	Perennial	August, October	October, November	C,N,G
12	Sikka/ Kanki ghas	*Chloris barbata*	Palatable	Annual	July, September	August, October	C,N
13	Sikka/ chhoti kanki ghas	*Chloris truncata*	Palatable	Annual	August, September	September, October	C,N
14	Gondli/ Rehwa ghas	*Chloris virgata*	Palatable	Perennial	August, October	September, November	C,N
15	Sonali/Fulva ghas	*Chrysopogon fulvus*	Palatable	Perennial	August, November	September, December	N,C,S,G
16	Khas ghas	*Chrysopogon/ Vetiveria zizanioides*	Palatable	Perennial	August, October	September, November	C,N
17	Kodo ghas	*Coix aquatica*	Palatable	Perennial	August, October	September, November	C,N,G
18	Rosha/ Sugandhi ghas	*Cymbopogon martini*	Initially palatable	Perennial	August, October	September, November	C,N,G
19	Doob ghas	*Cynodon dactylon*	Palatable	Perennial	January, December	January, December	N,C,S,G
20	Nagarmotha	*Cyperus odoratus*	Non palatable	Perennial	September, October	November, December	-
21	Kus ghas	*Desmostachya bipinnata*	Initially palatable	Perennial	August, October	September, November	C,N
22	Chhoti kandi ghas	*Dichanthium annulatum*	Palatable	Perennial	July, October	September, November	N,C,S,G
23	Kandi ghas	*Dichanthium caricosum*	Palatable	Perennial	July, September	August, October	N,C,G
24	Raie/ Raati ghas	*Digitaria abludens*	Palatable	Annual	August, October	September, November	C,N
25	Raati ghas	*Digitaria bicornis*	Palatable	Annual	August, October	September, November	C,N

S.No.	Common name	Botanical name	Edibility	Life cycle	Grassland phenology		Animal preference
					Flowering	Fruiting	
26	Raie/ Raati ghas	*Digitaria stricta*	Palatable	Annual	August, October	September, November	C,N
27	Samel/ Sawan ghas	*Echinochloa colona*	Palatable	Annual	August, October	September, November	C,N
28	Junglee nachni	*Eleusine indica*	Palatable	Perennial	July, October	September, November	C,N
29	Bada Sikka	*Enteropogon dolichostachya*	Palatable	Perennial	August, October	September, November	C,N
30	Bhurbhusi/ Jhunghania ghas	*Eragrostis bifaria*	Palatable	Perennial	July, September	September, November	N,C,G
31	Bhurbhusi/ Jhunghania ghas	*Eragrostis japonica*	Palatable	Perennial	August, October	October, November	N,C,G
32	Bhurbhusi/ Jhunghania ghas	*Eragrostis nutans*	Palatable	Perennial	August, October	October, November	N,C,G
33	Banpoha	*Eragrostis tenella*	Palatable	Annual	July, October	September, November	N,C,G
34	Banpoha	*Eragrostis unioloides*	Palatable	Perennial	July, October	September, November	N,C,G
35	Bhurbhusi/ Jhunghania ghas	*Eragrostis viscosa*	Palatable	Perennial	August, October	October, November	C,N
36	Rope grass/ Bhabar ghas	*Eulaliopsis binata*	Palatable	Perennial	September, November	October, December	N,G
37	Sukra/ Bhuin kata ghas	*Heteropogon contortus*	Palatable	Perennial	September, November	October, December	C,N,G
38	Underwater grass	*Hydrilla verticillata*	Palatable	Perennial	July, September	October, November	SD,S
39	Chir ghas	*Imperata cylindrica*	Palatable	Perennial	September, November	October, December	C,N,G
40	Ber/ Kunda ghas	*Ischaemum indicum*	Palatable	Perennial	July, September	September, October	N,C,S,G
41	Chakali/ Kunda ghas	*Ischaemum rugosum*	Palatable	Perennial	August, September	September, October	C,N,G
42	Muchhel Ghas/ Blue grass	*Iseilema laxum*	Palatable	Perennial	August, October	September, November	C,N,G
43	Chhaya ghas	*Oplismenus burmanni*	Palatable	Perennial	August, October	September, November	C, WB
44	Junglee sama	*Paspalidium flavidum*	Palatable	Annual	August, October	September, November	C,N
45	Moua/ small deenanath ghas	*Pennisetum hohenackeri*	Initially palatable	Perennial	August, October	September, November	C,N
46	Machhlikata/ Khopra ghas	*Perotis indica*	Palatable	Perennial	August, October	September, November	C,N
47	Reed ghas	*Phragmites karka*	Palatable	Perennial	September, December	October, January	SD,S
48	Roul/ Itch Ghas	*Rottboellia exaltata/ cochinchinensis*	Palatable	Annual	August, October	September, November	C,N

S.No.	Common name	Botanical name	Edibility	Life cycle	Grassland phenology		Animal preference
					Flowering	Fruiting	
49	Munja/ Sarkanda ghas	*Saccharum munja*	Initially palatable	Perennial	September, November	October, December	SD,N
50	Kans ghas	*Saccharum spontaneum*	Initially palatable	Perennial	September, November	October, December	C,N,G
51	Nadi ghas	*Sacciolepis indica*	Palatable	Annual	August, October	September, November	C,WB
52	Chhuria ghas	*Scleria levis*	Non-palatable	Perennial	July, September	August, October	-
53	Van bajra/ Nivri ghas	*Setaria glauca*	Palatable	Annual	August, October	October, November	C,N
54	Chipka ghas	*Setaria intermedia*	Palatable	Perennial	August, October	October, November	C,N,G
55	Van bajra/ Yellow foxtail/ Peeli ghas	*Setaria pumila*	Palatable	Annual	August, October	September, November	C,S,N
56	Van jwar	*Sorghum halepense*	Palatable	Perennial	September, October	October, November	C,N,G
57	Guner ghas	*Themeda quadrivalvis*	Palatable	Perennial	August, October	October, December	C,N,G
58	Guner ghas	*Themeda triandra*	Palatable	Perennial	July, October	October, November	C,N,S,G
59	Phulbahri/ Jhadu ghas	*Thysanolaena maxima/ latifolia*	Palatable	Perennial	October/ January	December/ February	G
60	Padhar grass	*Typha angustifolia*	Initially palatable	Perennial	July, September	September, December	WB
61	Makra murat	*Urochloa ramosa*	Palatable	Annual	September, October	October, November	C,S,G

Note: Abbreviation for gaur (G), cheetal (C), sambhar (S) , swamp deer (SD), nilgai (N), wild boar (WB)

Moth Diversity in Wasi Region of Wardha District, Maharashtra, India.

Atul S Kitey[1] and Imran R Mithani[2]
([1]Department of Zoology, Dr. Ambedkar College of Arts, Commerce & Science, Chandrapur, Maharashtra, India. E-mail : atulskitey@gmail.com.
[2]P. G. Department of Zoology, Dr. Ambedkar College of Arts, Commerce & Science, Chandrapur, Maharashtra, India. E-mail : imran.mithani111@gmail.com.
*Corresponding Author : Atul S. Kitey, E-mail : atulskitey@gmail.com, Mob. 9823990023)

Citation: Kitey Atul and Mithani Imran. (2025). Moth Diversity in Wasi Region of Wardha District, Maharashtra, India. *Ela Journal of Forestry and Wildlife*. 14(4): 1847-1853

Date of Publication: 31 December 2025

ISSN 2319-4361

Abstract

Diversity and distribution of moths depends on the inter-relationships between moths and other animals and external environmental factors. Diversity and distribution of moths was not explored for Wasi hence this study was conducted from the December 2024 to March 2025. The study revealed the dominance of the family Geometridae with 13 species, followed by Crambidae with 9 species, Erebidae with 7 species, Pyralidae with 4 species, Noctuidae with 3 species, Lecithoceridae, Limacodidae and Bombycidae with 1 species each. Highrichness, diversity and distribution of moths were seen in rainy season because of the growth of particular plants on which the larvae feed. This study records the distribution and diversity of moth species in the Wasi region.

Key words

Moths, Diversity, Lepidoptera, Light trap, Wasi, Maharashtra.

Introduction

Insects represent the most abundant and diverse group within the animal kingdom, characterized by their soft bodies and remarkable variation in size. Moths, order Lepidoptera, often receive less attention inspite of their muted colouration, bulky forms, nocturnal activity, and destructive behaviour such as damaging clothes or crops (Sharma & Bisen, 2013). Despite this, moths play vital role in ecosystem including nocturnal pollination (Macgregor *et al*., 2015); ecological indicators and as an essential part of the food chain, serving as prey for birds, bats, and other animals (Holloway, 1984),.

Moths are easily recognised by their bodies and wings, which are typically covered with pigmented

scales that produce distinctive colour patterns (Nayar *et al*., 1976). Their antennae vary widely in form. In Indian culture, insects have long fascinated people, and moths in particular are economically significant due to their role in silk production. Notable silk-producing species include the domesticated mulberry silk moth (*Bombyx mori*) and the Tasar silk moth (*Antheraea mylitta*). (Vidakovic *et al*., 2020)

India is home to approximately 12,000 identified moth species (Chandra & Nema, 2007), though it is estimated that an additional 20,000 to 30,000 species of Lepidoptera remain undiscovered (Sterling, 2019). Various regional studies have documtnted the diversity of moths: Gadhikar *et al*. (2015) recorded 628 species from seven families, with Noctuidae being being the most abunant and Geometridae the least, represented by just 22 species. Wankhade *et al*. (2021) identified 34 species across 8 families and 17 subfamilies, with Erebidae as the most prevalent. Chandrakar *et al.* (2022) documented 184 species through photographic records, identifying 163 specimens, 45 at the species level and two at the genus level. More recently, Kitey *et al*. (2025) reported 104 species from 18 families and 47 subfamilies, again with Family Erebidae showing dominance.

The Wasi region has remained largely unexplored in terms of moth biodiversity, with no prior documented records. Therefore, the present study aims to fill this knowledge gap by compiling a comprehensive checklist of moth species for the area. This baseline data will support future research and help assess the potential impact of human activity on the region`s moth diversity.

Materials and Methods

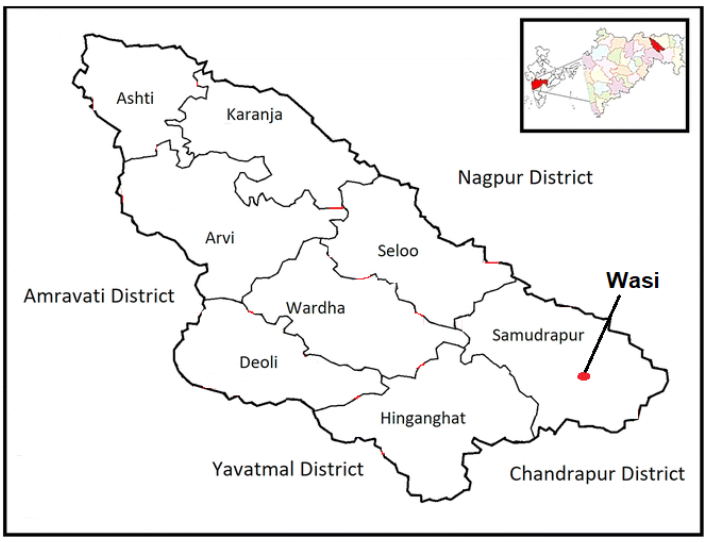
Study Area

Wasi village encompasses a total area of 552 hectares and is geographically positioned at 20.51621830°N latitude and 79.00105850°E longitude, 228 m a.s.l.

The elevation of the area contributes to its dry and hot climate. Temperatures range from a high of 47.9°C (118°F) to a low of 13.1°C (55.6°F). Of the total land, 39.65 hectares are designated as forested land, 47.43 hectares are categorized as non-agricultural, and the remaining 465.92 hectares are used for irrigated agriculture.

The village is encircled by several water reservoirs:

- Pothra Dam lies approximately 9.1 km away,



- Lal Nala Reservoir is located 7.4 km away,
- Labhansarad Dam and Reservoir is about 12 km from the village, and
- Chargaon Reservoir is the farthest at 26 km away.
- Navegaon Gate Safari entrance to the Tadoba National Park.

Sampling and Identification

Moth specimens were documented using a 6’ x 6’ white cloth screen set on stands and positioned near LED lights ranging from 40W to 200W to attract moths from 07:00pm to 11:00pm. (Jonason *et al., 2014*)

The survey was conducted between December 2024 to March 2025.

5 to 7 visits per month were conducted. In addition to the field setup, some specimens were photographed from walls near streetlights and during local marriage

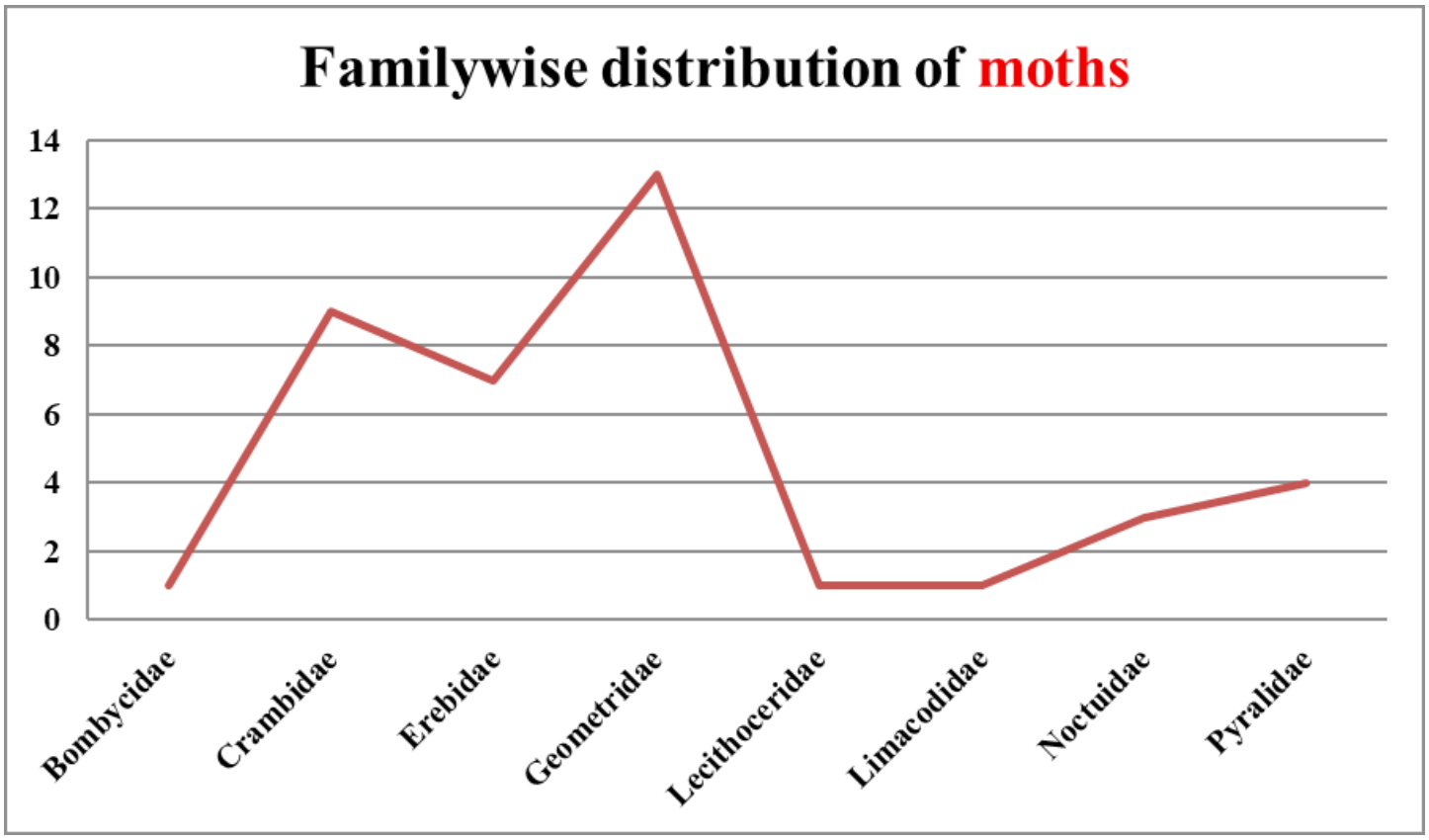
receptions using a Redmi 10 S AI-CAM with a 50 MP camera. Importantly, no moths were harmed during the study; all specimens were photographed only, in alignment with ethical guidelines. Identification was carried out based on morphological features, referencing standard literature and visual comparisons with databases like: www.mothsofindia.com, www.inaturalist.org, www.indiabiodiversity.org

Results and Discussion

In this study, a total of 39 moth species were recorded from 8 families and 17 subfamilies. Of these, 27 species were identified at the species level, while 12 were classified at the genus level.

Table 1: List of moth species found in Wasi region

S.N.	Superfamily	Family	Subfamily	Species
1	Bombycoidea	Bombycidae	Bombycinae	*Trilocha varians* (Walker, 1855)
2	Gelechioidea	Lecithoceridae	Lecithocerinae	*Lecithocerids sp.* (Merchand, 1947)
3		Geometridae	Ennominae	*Cleora alienaria* (Walker, 1860)
4				*Boarmini-genera sp.* (Duponchel, 1845)
5				*Hyposidra talaca* (Walker, 1860)
6				*Hyperithra lutea* (Stoll, 1781)
7			Geometrinae	*Microloxia indecretata* (Walker, 1863)
8				*Comostola laesaria* (Walker, 1861)
9				*Pelagodes-Thalassodes sp.*
10				*Comostola pyrrhogona* (Walker, 1866)
11			Sterrhinae	*Sterrhinae-genera sp. 1* (Meyrick, 1892)
12				*Sterrhinae-genera sp. 2* (Meyrick, 1892)
13				*Idaea amplipennis* (Butler, 1889)
14				*Scopula sp.* (Schrank, 1802)
15				*Scopula pulchellata* (Fabricius, 1794)
16	Noctuoidea	Erebidae	Agenainae	*Asota cericae* (Fabricius, 1775)
17			Arctiinae	*Miltochrista obsoleta* (Moore, 1878)
18			Herminiinae	*Lysimeliane leusalis* (Walker, 1859)
19			Lymantriinae	*Lymantri sp.* (Hübner, 1819)
20				*Euproctis lunata* (Walker, 1855)
21				*Sphrageidus similis* (Fuessly, 1775)
22				*Sphrageidus simlensis* (Gupta, 1986)
23		Noctuidae	Acintiinae	*Acontia sp.* (Ochsenheimer, 1816)
24			Eustrotiinae	*Ozarba sp.* (Walker, 1865)
25			Noctuinae	*Leucania loreyi* (Duponchel, 1827)
26	Pyraloidea	Crambidae	Acentropinae	*Parapoynx diminutalis* (Snellen, 1880)
27				*Parapoynx affinialis* (Guenée, 1854)
28			Pyraustinae	*Pyrausta signatalis* (Walker, 1866)
29				*Achyra nudalis* (Hübner, 1796)
30			Spilomelinae	*Herpetogramma rudis* (Warren, 1892)
31				*Spoladea recurvalis* (Fabricius, 1775)
32				*Cydilima laticostalis* (Guenée, 1854)
33				*Omiodes indicata* (Fabricius, 1775)
34				*Leucinode sorbonalis* (Guenée, 1854)
35		Pyralidae	Phycitinae	*Epicrocis sp.* (Zeller, 1848)
36				*Zophodiagros sulariella* (Hübner, 1809)
37			Pyralinae	*Pyralidae-genera sp. 1* (Latreille, 1809)
38				*Pyralidae-genera sp. 2* (Latreille, 1809)
39	Zygenoidea	Limacodidae	Limacidinae	*Aergina hilaris* (Westwood, 1848)



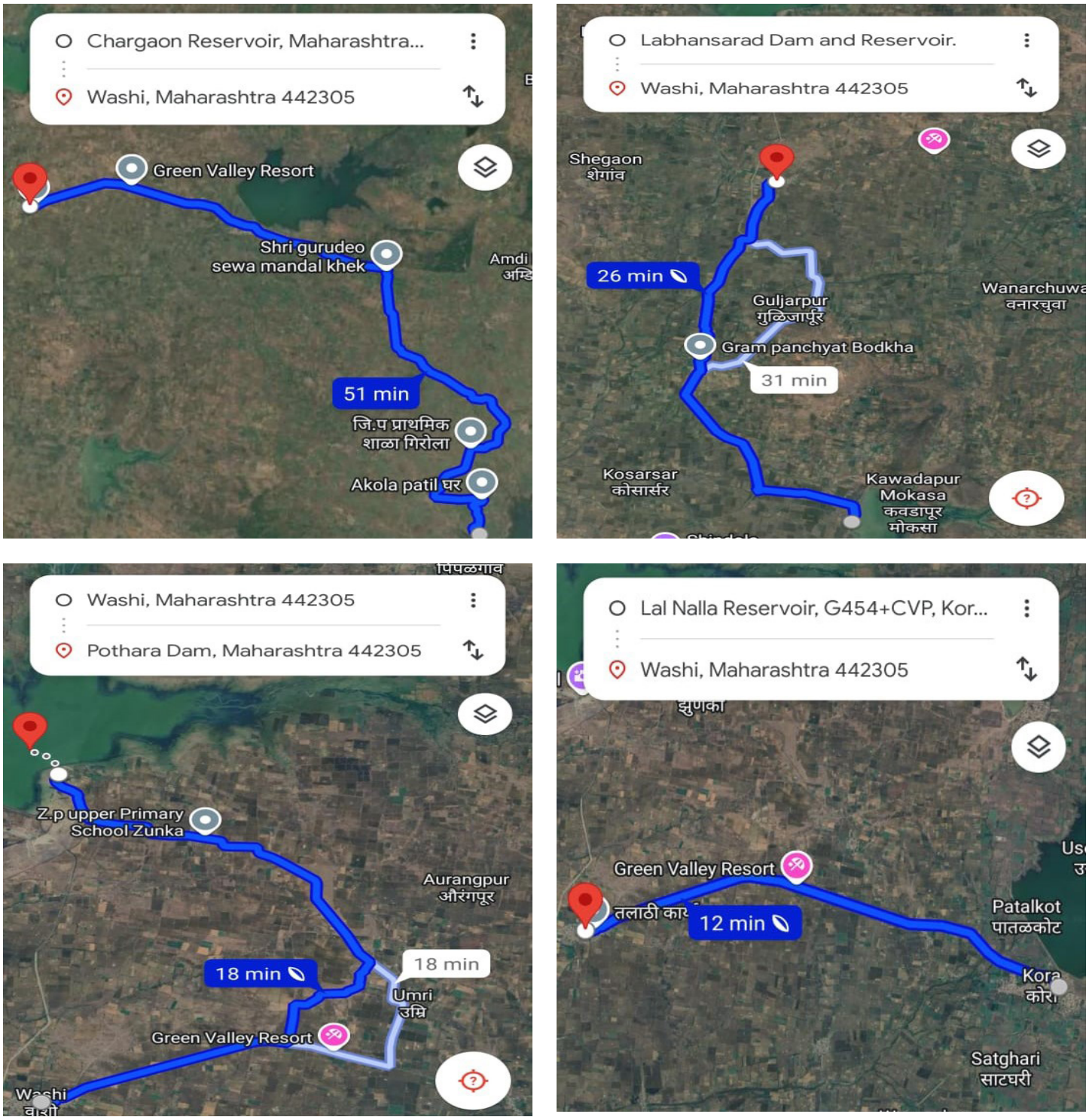
The family Geometridae showed the highest representation with 13 species. This was followed by Crambidae (9), Erebidae (7), Pyralidae (4), Noctuidae (3), Lecithoceridae (1), Limacodidae (1), and Bombycidae (1).

Previous studies by Gurule *et al*. (2011), Shubhalaxmi *et al*. (2011), Gadhikar *et al*. (2015), Wankhade *et al*. (2021), Giri *et al*. (2022), and Fernandes (2024) have noted the Erebidae family as consistently dominant throughout the year in various locations across Maharashtra and Goa. However, in the present study, Geometridae exhibited greater richness, suggesting potential ecological variations or sampling biases unique to the Wasi region during the study period. Moth assemblages exhibit differential responses to artificial light sources, with members of the family Geometridae showing a comparitively strong attraction to LED light and white light. This phototactic bias can lead to an overrepresentation of Geometridae in light-trap samples, thereby introducing potential sampling bias in diversity assessments (Van Geffen, K. G., *et al*., 2015). Furthermore, the family demonstrates pronounced nocturnal activity, with peak abundance typically recorded during the early night hours (19:00 – 23:00 h), which coincides with the period of highest light attraction and sampling efficiency.

Acknowledgement

The authors are grateful to Prof. Dr. Wasudeo J. Choudhari for his valuable support and for providing facilities to carry out our research work. Also, we are thankful to Dr. Rajesh Dahegaonkar (Principal, Dr. Ambedkar College of Arts, Commerce and Science, Chandrapur, Maharashtra) for supporting our research.

Photoplate 1 : Moths recorded during the study



Maps 1 to 4: Maps of line transects conducted during the study

References

- Benton, T.G. (1995). Biodiversity and biogeography of Henderson island insects. *Biological Journal of Linnean Society*, 56(1-2): 245-259.
- Chandra, K. &Nema, D.K. (2007). Insecta: Lepidoptera: Heterocera (Moths). Fauna of Madhya Pradesh (including Chhattisgarh), State Fauna Series. *Zoological Survey of India*. 15(1):347-418.
- Chandrakar, M. R..Kalwade, P. S. &Pachlore, G. S. (2022). Biodiversity of moth in HinganghatTaluka, Wardha, Maharashtra (India). *Advances in Zoology and Botany*10(1):18-24.
- Fernandes,D. (2024). A preliminary study of moth of verna. *Journal of Applied Entomologist* 4(1):29-42.
- Gadhikar, Y.A.,Chirde, S.G., Raut, N.I., Deshmukh, U.S. and Sampat, S. (2015). A Preliminary checklist of Moth species from Amravati city, Maharashtra, (India). *Global Journal of Biology, agriculture and Health Sciences*, 4(1): 48-51.
- Giri, N. R. and Wankhedkar, P. T., (2022): Different patterns and ecological status of moth around Nashik district from Sahyadri region (Savalghat) Maharashtra. *International Journal of Creative Research Thoughts* (IJCRT) 10(1): 620-628.
- Gurule, S. A., Nikam, S. M., Borse, V. B., (2011): Faunastic studies on macro moth (Lepidoptera: Noctuoidea) from North Maharashtra**.** Proceedings : *International Conference on Biodiversity and Its Conservation* 2011: 1-16.
- Holloway, J.D. (1984). Moths as indicator organisms for categorizing rain-forest and monitoring changes and regeneration. In: *Tropical Rain-Forest. The Leeds Symposium*.
- Jonason, D., Franzen, M., & Ranius, T., (2014): Surveying moths using light traps: Effects of weather and time of year. PLOS ONE, 9(3), e92453. https://doi.org/10.1371/journal.pone.0092453.
- Kitey, A. S., Mithani, I. R., Dahegaonkar, N. R. (2025). Diversity of moths in bor wildlife sanctuary, Maharashtra, India. *International Journal of Entomology Research*, Volume 10, Issue 5, 108-113.
- Macgregor, C.J., Pocock, M. J. O., Fox R., and Evans, D. M. (2015). Pollination by nocturnal Lepidoptera, and the effects of light pollution: a review. *Ecological Entomology*, 40, 187-198.
- Nayar, K. K., Ananthakrishnan, T. N., David, B. V. (1976). GENERAL AND APPLIED ENTOMOLOGY. *Tata McGraw-Hill Publishing Company Limited*, NEW DELHI, 224pp.
- Sharma, A.K. and Bisen, U.K. (2013). Taxonomic documentation of insect pest fauna of vegetable ecosystem collected in light trap. *International Journal of Environmental Science: Development and Monitoring* 4(3):1-8.
- Shubhalaxmi V., Kendrick, R. C., Vaidya Alka, Kalagi Neelima and Bhagwat A., (2011): Inventory of moth fauna (Lepidoptera: Heterocera) of the Northern Western Ghats, Maharashtra, India, *Journal of the Bombay Natural History Society*, 108(3): 183-205.
- Sterling, M.(2019). British lawyer comes to India chasing moths. Mongabay,India.https://india.mongabay.com/10.
- van Geffen, K. G., Van Eck., de Boer, R. A. van Grunsven, R. H. A., Salis, L., Berendse, F., & Veenendaal, E. M. (2015). Artificial light at night inhibits mating in a geometrid moth. *Insect Conservation and Diversity*; 8(3), 282-287.
- Vidakovic, D., Magalhães M.C.F., Scheibel Tobias (2020). "Silk properties and processing from mulberry and non-mulberry silkworms." *Materials Science and Engineering C*, 107, 110290.
- Wankhade, L. N., Bidwai, P. A., Bhonde, R. S. &Kadwe, M. W. (2021). A study on the moth (Insects:Heterocera) diversity during rainy season from Tirora, District Gondia, Maharashtra. *Journal of Entomology and Zoology Studies*, 9(6): 93-96.

Species Diversity, Dietary Habits, and Conservation Concerns of Herpetofauna in Lilkee Beed, Churu, Rajasthan (India)

Satpal*, B L Mehra[1] and Pramendra Kumar Chauhan[2]

[1]Professor, Department of Zoology, Government Lohia College, Churu (Rajasthan) 331001. blmehra.md@gmail.com;
[2]Research Scholar, Department of Zoology, Government Lohia College, Churu (Rajasthan) 331001. pramendrakumar100491@gmail.com)
(*Research Scholar, Department of Zoology, Government Lohia College, Churu (Rajasthan) 331001 satpaljisuthar@gmail.com

Citation: Satpal*, Mehra B L and Chauhan Pramendra Kumar. (2025). Species Diversity, Dietary Habits, and Conservation Concerns of Herpetofauna in Lilkee Beed, Churu, Rajasthan (India). *Ela Journal of Forestry and Wildlife*. 14(4): 1854-1861

Date of Publication: 31 December 2025

ISSN 2319-4361

Keywords

Herpetofauna; Lilkee Beed; Thar Desert; Amphibians; Reptiles; Biodiversity; Conservation.

Abstract

We studied the herpetofauna of Lilkee Beed of Churu, Rajasthan (India), a unique desert habitat from July 2023 to June 2024. The study documented four amphibian species belonging to order Anura in two families (Bufonidae and Dicroglossidae), both insectivorous, classified as Least Concern by the IUCN Red List. Twenty reptilian species from the order Squamata in ten families, with Agamidae, Gekkonidae and Lacertidae being most prevalent. Among these reptiles, ten species are carnivorous, nine insectivorous and one herbivorous. 18 out of 20 species of reptiles in the study are Least Concern by the IUCN. *Eryx johnii* (Red sand boa) is near threaten and *Saara hardwickii* (Indian spiny tailed lizard) is vulnerable. This study emphasizes the necessity for ongoing ecological monitoring and management in Lilkee Beed, including preservation of habitats to enhance biodiversity.

Introduction

Amphibians are currently represented by three living orders: Anura (frogs and toads), Caudata (salamanders and newts), and Gymnophiona (caecilians, also known as limbless amphibians). Worldwide, there are 8,156 amphibian species, with 427 species identified in India, accounting for approximately 5.29% of global amphibian diversity (Chandra et al., 2020). Significant contributions to the understanding of the amphibian fauna in the Indian Desert Biogeographic Zone are made by Smith (1931, 1935, and 1943), Mansukhani and Murthy (1964), Sharma SK (1995), Sharma (1996),

and Sharma and Gaur (2005).

Cold-blooded reptiles inhabit nearly every corner of the globe, with the notable exception of icy regions. Out of the 19 orders of reptiles, only four orders have survived to the present day: Crocodylia (crocodiles), Testudines (turtles and tortoises), Squamata (lizards and snakes), and Rhynchocephalia (tuatara). Globally, reptilian diversity is represented by 11,136 species, categorized within 1,206 genera and 92 families (Uetz et al., 2020). The Indian subcontinent boasts a significant reptilian diversity, with 641 species recorded (Chandra et al., 2020).

The study of reptilian fauna in the Indian Desert has been undertaken by Smith (1931, 1935, 1943), Nama and Khichi (1974), Biswas and Sanyal (1977), Sharma SK (1995, 2008), Sharma RC (1996), Sharma and Gaur (2005), Gaur (2009), Mittal and Khandal (2010), Agarwal and Srikanthan (2013), Bhupathy and Mathur (2013), Gaur et al. (2013), Bhatnagar et al. (2013), Das et al. (2015), Agarwal et al. (2015), Satish Kumar (2015), Ridhima et al. (2015) and Sharma et al. (2016). Their research has focused on diversity and distribution of reptiles.

The Lilkee Beed is facing many ecological challenges such as excessive population of herbivorous animals, climatic changes and intrusion of herbivorous animals in nearby agriculture fields etc., whose solution is necessary for ecological equilibrium in this area (Mehra B. L. and Satpal, 2019). 70 different bird species are recorded from Lilkee Beed with three species classified as near threatened and one species is classified as endangered category by IUCN (Satpal et al., 2024). So far, research has been done only on the ecology of Lilkee Beed and its avian diversity. Hence, we carried out this research to document the herpetofauna of this region to create a database and assist in their conservation in this unique habitat of the Thar Desert.

Methodology

Study Areas: Churu district located in the north of Rajasthan is part of the Thar Desert, which is home to a diverse range of flora and fauna. The Tal Chhapar Sanctuary is world famous for *Antilope cervicapra* (Black buck). Lilkee Beed (also known as Beed Rajgarh) is situated about 30km northeast of Rajgarh tehsil towards the north of Churu district headquarter. This Beed is spread between 28°45′18″ north latitude to 28°47′22″ north latitude and 75°10′05″ east longitude to 75°12′58″ east longitude, and altitude 230 m to 256 m above sea level. This area has high sand dunes with plains. The region has significant diversity in vegetation, such as grasslands, less dense forests, and dense forests, which is rich in terms of biodiversity. Hence, the herpeto-faunal diversity of Beed and its surroundings has been studied. Amphibians are found near water sources; hence this study area was centered around it. Habitats such as dense bushes and leaf-covered ground were also selected because reptiles can hide in these places for shelter and food. Resting and nesting sites were also examined in this study for breeding success.

Methods for Studying Herpetofauna

Visual Encounter Survey (VES) Method: The Visual Encounter Survey method is particularly effective for assessing species richness and abundance along survey paths (Crump and Scott 1994). VES is a recognized method for inventorying terrestrial herpetofauna (Campbell and Christman 1982; Corn and Bury 1990). Both area-constrained and time-constrained approaches were utilized in the surveys.

Acoustic Monitoring: For amphibians, especially frogs, acoustic monitoring can be an effective method to assess species presence and abundance. By recording calls during the breeding season, we can figure out population size and location (Pomezanski, 2021).

Torch count method: The torch count method is a type of visual encounter survey commonly used for surveying aquatic frogs at night (Crump and Scott, 1994).

Pitfall trap: Pitfall traps are a standard method for sampling terrestrial amphibians and reptiles, particularly smaller species (Corn and Bury, 1990).

Field observation methods: Several field observation methods, such as basking observation method, turning stones, gleaning leaf litter, shaking bushes and wooden logs, observing the wall of man-made ponds, tankas, and other structures were used (Heyer et al., 1994).

Data collection

Survey and Monitoring of herpetofauna

For the study of amphibians, searches were carried out in all designated habitats during both day and night hours in all seasons. Terrestrial ecosystems were closely

monitored for amphibians, such as toads, that spend most of their time on land. Methods were used, such as searching under wooden logs and stones, examining after removing the upper layer of litter, rubble, and soil, searching in small bushes and hollow trees, and examining water catchment areas. Amphibians like frogs spend most of their time in water, so the torch count method is used for water habitats, while pit fall traps method is used for terrestrial amphibians.

The reptile species found in and around the research region were tracked using techniques such pitfall trap, visual encounter surveys, and standard walk transects. Additionally, methods used for terrestrial amphibians have also been used for reptilian fauna.

During these surveys, photographs were also taken for species identification with the help of field guides, so that the species identification process could be strengthened. Semi-structured interviews were used to collect information about these species from people living in the vicinity of Lilkee Beed. High-quality photographs and pictorial field guides, including "The Book of Indian Reptiles and Amphibians" (Daniel, 2002) and "An Illustrated Guide to Common Indian Amphibians & Reptiles" (Ganesh, 2015), were used to know presence and identify herpetofauna. Photographs of species that were tricky to identify were sent to experts for identification and verification.

Results and discussion

All members of Bufonidae and Dicroglossidae family found in the study area show insectivorous feeding habits that regulate insect population dynamics in Lilkee Beed's ecosystem, Table1. All amphibians in the study area are classified as Least Concern by the IUCN, which indicates their current stable population and low threat status. But habitat conservation measures are necessary to minimize the potential threats posed to this delicate regional ecosystem by climatic changes and human activities.

The presence of 20 species from 10 families of the Order Squamata reflects the considerable biodiversity of the Lilkee Beed, Table 2. The presence of 10 carnivorous, 9 insectivorous, and one herbivorous reptile species in the study area indicates diverse feeding habits within the reptilian group.

18 out of 20 species of reptiles in the study area are classified as Least Concern by the IUCN, which indicates good population status of these species. While *Eryx johnii* (Red sand boa) is near threatened and *Saara hardwickii* (Indian spiny-tailed lizard) is declared vulnerable, this draws our attention to the need for efforts for the protection of these species and their habitat.

Local superstitions in the Lilkee Beed region pose significant threats to herpeto-fauna. *Varanus bengalensis* (Monitor Lizard) and *Varanus griseus* (Desert Monitor) are often killed due to the false belief that they are highly venomous. *Saara hardwickii* (Spiny-tailed Lizard) is poached for its fat, valued for aphrodisiac properties. Snakes also face 'mercy killing' due to a unique misconception that their limblessness causes constant physical suffering, alongside a general fear that all species are deadly. These socio-cultural myths highlight the urgent need for community-based conservation awareness.

Conclusion

Although the study area is home to many species of herpetofauna, the presence of threatened and vulnerable reptile species, local superstitions and lack of awareness are threats. In order to overcome these obstacles, activities like awareness campaigns should be conducted by forest officers with NGO's to create awareness about these species. The administration should work with the locals to understand the problems of the people and farmers living around Lilkee Beed and make efforts to solve them. The interests of all stakeholders must be taken into consideration for sustainable development, which will preserve the biodiversity and ecosystem of the area. The findings from the studies at Lilkee Beed emphasize the critical importance of continuous monitoring and strategic management to maintain ecological balance and ensure the long-term survival of its diverse herpetofauna.

Acknowledgment

I convey my sincere gratitude to Professor B. L. Mehra for their invaluable guidance and support throughout this research. I also extend my heartfelt thanks to the University Grant Commission.

Author Contribution:

Original Idea and study design: Mr. Satpal conceived the original idea for the study, identifying the research gap and formulating the main hypotheses. He designed the study framework, outlining the methodology and objectives.

Result

Table1. Feeding habits, IUCN status, and amphibian diversity observed in and around Lilkee Beed.

Family	Scientific name	Common name	Feeding habits	IUCN Status*
Bufonidae	*Duttaphrynus melanostictus*	Asian common Toad	Insectivorous	LC
	Duttaphrynus stomaticus	Marbled Toad	Insectivorous	LC
Dicroglossidae	*Euphlyctis cyanophlyctis*	Indian skipper frog	Insectivorous	LC
	Hoplobatrachus tigerinus	Indian bullfrog	Insectivorous	LC

Table2. Feeding habits, IUCN status, and reptilian diversity observed in and around Lilkee Beed.

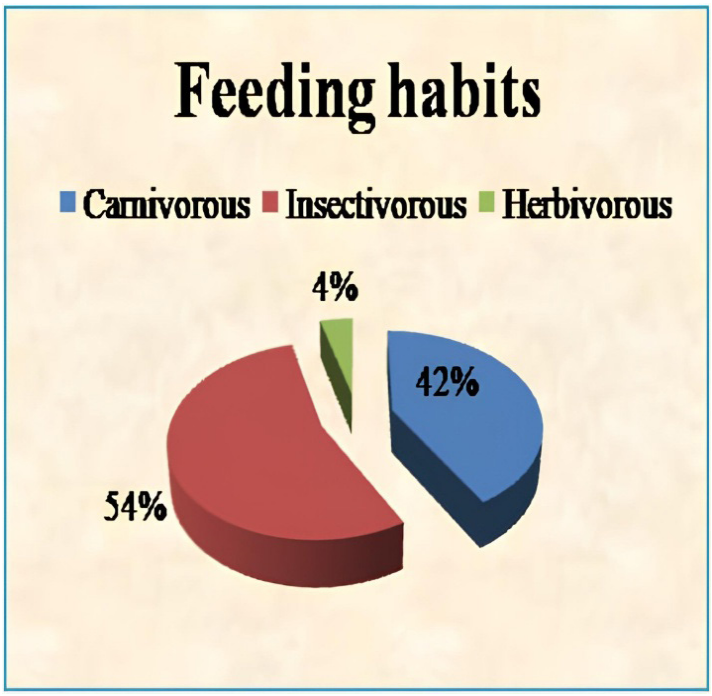
Family	Scientific name	Common name	Feeding habit	IUCN status*
Agamidae	*Calotes versicolor*	Oriental Garden Lizard	Insectivorous	LC
	Saara hardwickii	Indian Spiny-tailed Lizard	Herbivorous	VU
	Trapelus agilis	Brilliant Ground Agama	Insectivorous	LC
Gekkonidae	*Cyrtopodion scabrum*	Rough-tailed Gecko	Insectivorous	LC
	Hemidactylus frenatus	Common House Gecko	Insectivorous	LC
	Hemidactylus flaviviridis	Yellow-belly Gecko	Insectivorous	LC
Lacertidae	*Acanthodactylus cantoris*	Indian Fringe-fingered Lizard	Insectivorous	LC
	Ophisops jerdonii	Jerdon's Cabrita	Insectivorous	LC
	Ophisops microlepis	Small-scaled Lacerta	Insectivorous	LC
Scincidae	*Eurylepis taeniolatus*	Ribbon-sided Skink	Insectivorous	LC
Varanidae	*Varanus bengalensis*	Monitor Lizard	Carnivorous	LC
	Varanus griseus	Desert Monitor	Carnivorous	LC
Boidae	*Eryx johnii*	Red Sand boa	Carnivorous	NT
Colubridae	*Lycodon aulicus*	Indian Wolf Snake	Carnivorous	LC
	Platyceps ventromaculatus	Glossy-bellied Racer	Carnivorous	LC
Lamprophiidae	*Psammophis leithii*	Leith's Sand Snake	Carnivorous	LC
Elapidae	*Bungarus caeruleus*	Common Krait	Carnivorous	LC
	Naja naja	Indian Cobra	Carnivorous	LC
Viperidae	*Echis carinatus*	Indian Saw-scaled Viper	Carnivorous	LC
	Daboia russelii	Russell's Viper	Carnivorous	LC

Abbreviations:

IUCN: International Union for Conservation of Nature and Natural Resources (IUCN, 2025-1)

IUCN Categories for species: CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient.

* The information based on the IUCN Red List (IUCN 2025-1)



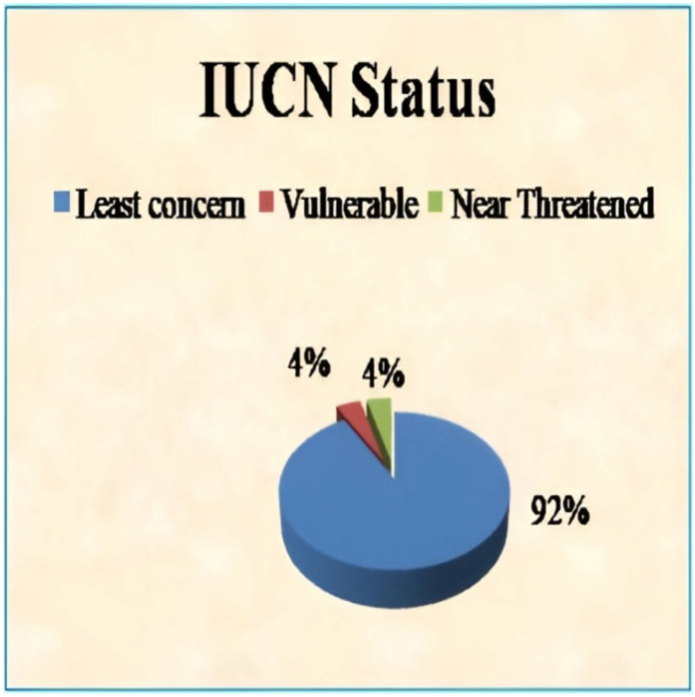


Figure 1 & 2: Pie chart presentation of feeding habits and IUCN status of herpeto-faunal diversity of Lilkee beed

Duttaphrynus melanostictus

Duttaphrynus stomaticus

Euphlyctis cyanophlyctis

Hoplobatrachus tigerinus

Figure 3: Plate of Amphibian of Lilkee Beed

Figure 4: Plate of Reptiles of Lilkee Beed

Survey and Data Collection: Mr. Satpal and Dr. B. L. Mehra designed the survey and led the data collection process, ensuring accurate data gathering from participants. Mr. Pramendra Kumar Chauhan assisted in conducting field observations, meticulously recording the herpetofauna of Lilkee Beed to support comprehensive data collection.

Data Analysis and Manuscript Preparation: Mr. Satpal and Dr. B. L. Mehra analyzed the data and interpreted the results. Mr. Satpal wrote the first draft of the manuscript, and all the other authors helped revise and approve it.

References

- Agarwal, I., & Srikanthan, A.N. (2013) Further records of the Sindh Awl-Headed Snake, *Lytorhynchus paradoxus* (Gunther, 1875), from India with notes on its habitat and natural history. *Russian J. Herpetol.*, 20(3): 165-170.
- Agarwal, I., Goyal, S. Qureshi, and Qamar, P. (2015) Lizards of the Thar Desert – Resource partitioning and community composition. *J. Arid Env.*, 118: 58-64.
- Bhatnagar, C., Sharma, S.K., Mathur, M. and Sharma, B. K. (2013) Ophidians of Rajasthan. In: *Faunal Heritage of Rajasthan, India: General Background and Ecology of Vertebrates* (Eds. Sharma, B.K.): 311-330, Springer Science, Bussiness Media New York.
- Bhupathy, S. and Mathur, R. (2013) Chelonian Status and Conservation in Rajasthan. In: *Faunal Heritage of Rajasthan, India: General Background and Ecology of Vertebrates* (Eds. Sharma, B.K.): 277-286, Springer Science, Business Media New York.
- Biswas, S., and Sanyal, D.P. (1977) Fauna of Rajasthan, India, Part: Reptilia. *Rec. zool. Surv.* India, 73: 247-269.
- Campbell HW, Christman SP (1982) Field techniques for Herpetofaunal community analysis In: Scott NJ Jr (ed) Herpetological communities, U.S.D.I. fish and wildlife service. Wildlife research report no 13, Washington, D.C., p 239
- Chandra, K., Raghunathan, C. and Sheela, S. (2020) *Animal Discoveries 2019 New Species New Records*: 1-180 (published by the director, Zool. Surv. India, Kolkata).
- Corn PS, Bury RB (1990) Sampling methods for terrestrial amphibians and reptiles. USDA Forest Service, General technical report PNW-GTR-256, 34 pp
- Crump ML, Scott NJ Jr (1994) Visual encounter surveys. In: Heyer WR, Donnelly MA, Mcdiarmid RW, Hayek LAC, Foster MS (eds) *Measuring and monitoring biological diversity-standard methods for amphibians*. Smithsonian Institution Press, Washington, DC, pp 84–92
- Daniel, J. C. (2002) *The book of Indian reptiles and amphibians*. Bombay Natural History Society; Oxford University Press.
- Das, S.K., Joshi, M. and Sahoo, S. (2015) On the population status of Indian spiny-tailed lizard, *Sarra hardwickii* out the Thar desert of Rajasthan, with a preliminary report on the herpetofauna of Sariska. *Herpetol. Notes*, 8:51-54.
- Ganesh, S. R. (2015) *An illustrated guide to common Indian amphibians & reptiles* (E. M. Ramanujam, Illus.). Chennai Snake Park Trust.
- Gaur, S. (2009) Spicies Richness and Dominance of Reptiles in the Aravalli foothills of Rajasthan. In: *Faunal Ecology and Conservation of the Great Indian Desert* (Eds Suvaperuman et al. 2009) 53-64, Springer Science, Business Media New York.
- Gaur, S., Kumar, S. and Rathore, N.S. (2013) Important species of Lizards in the Thar Desert of Rajasthan. In: *Faunal Heritage of Rajasthan, India: General Background and Ecology of Vertebrates* (Eds. Sharma, B.K.): 287-293, Springer Science, Business Media New York.
- Heyer, W.R., Donelly, M.A., McDiamid, R.W., Hayek, L.A.C., & M.S. Foster (1994) Measuring and monitoring biological diversity, Standard methods for amphibians. Washington, Smithsonian Institution Press.
- IUCN (2025) The IUCN Red List of Threatened Species. IUCN 2025-1. Switzerland. https://www.iucnredlist.org/ (accessed August 2025)
- Mansukhani, M.R. and Murthy, T.S.N. (1964) Fauna of Rajasthan, India, Part IV, Amphbia. *Rec. zool. Surv. India*, 62: 51-60.
- Mehra, B.L. and Satpal (2019) Ecological Study of Lilkee Beed of Churu (Rajasthan). *International Journal of Innovative Research in Science, Engineering and Technology* 8(9): 9569-9574.
- Mittal, G., and Khandal, D. (2010) A rapid survey of squamate reptiles in the Thar Desert of Rajasthan, India. *Cobra* (Chennai)), 4(1): 28-39.
- Nama, H.S., and Khichi, P.S. (1974) Studies on some reptilian Trematodes from Rajasthan. *Ann. Arid Zone*, 13(4): 353-360.
- Pomezanski, D. (2021) How many years of acoustic monitoring are needed to accommodate for anuran species turnover and detection?. *Environmental Monitoring and Assessment*, 193(9): 553 https://doi.org/10.1007/s10661-021-09343-0
- Ridhima, S., Anant, P., Anirudhkumar, V., Aarti, S. and Bipin, C.M. (2015) Contributions to Herpetofauna of Jasailmer District-some photographic records. *Reptile Rap*, 17: 50-55.
- Satish Kumar, S. (2015) Notes on two new breeding colour morphs of male common garden lizard *Calotes*

versicolor (Daudin) from western Rajasthan. *Cobra* (Chennai), 9(2): 25-30.

- Satpal, Mehra, B.L. and Chauhan, Pramendra kumar (2024) The group composition, status, and richness of the avian life in and around Lilkee Beed of Churu, Rajasthan (India).*Asian Resonance*. 13(3) DOI:10.5281/zenodo.13283311.
- Sharma, R.C. (1996) Herpetology of the Thar Desert. In: *Faunal Diversity in Thar Desert: Gaps in Research* (Eds. Ghosh, A.K., Baqri, Q.H. and Prakash, I.): 297-306, Scientific Publishers, Jodhpur, India.
- Sharma, S. K. (1995) An overview of the Amphibians and Reptilian Fauna of Rajasthan. *Flora and Fauna*, 1(1): 47-48.
- Sharma, S. K. (2008) Presence of southern flap-shelled turtle *Lissemys punctata* granosa (Schoepff) in Southern Rajasthan. *Cobra* (Chennai), 2(2): 22-23.
- Sharma, R.C. and Gaur, S. (2005) Changing ecology and faunal diversity of amphibians and reptiles in Thar Desert of Rajasthan, India. pp 149-172. In: Tyagi, B.K. and Baqri, Q.H.(eds) *Changing Faunal ecology in the Thar Desert*, Scientific Publishers, Jodhpur, India.
- Sharma, V., Kishore, J., Dhawal, J., Tripathi, J., Pareek, S. and Sharma, K.K. (2016) Herpetofaunal checklist of Nagaur, Rajasthan. *Cobra* (Chennai) 10(1): 9-14.
- Smith, M.A. (1931) *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia.* 1. *Loricata testudines*, XXVIII+185+4(Unnumbered) pp.,2 pIs. 1 map.(frontispiece), London (Taylor and Francis Ltd.).
- Smith, M.A. (1935) *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia*, 2(Sauria), XIV+440+6+5, pp., 1pI; 2 map, London (Taylor and Francis Ltd.).
- Smith, M.A. (1943) *The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia.* 3(Serpentes), XII+584+6 pp, 1 fig. London (Taylor and Francis Ltd.).
- Uetz P., Freed, P. and Hosek, J. (eds.) (2020) The Reptile Database, http://www.reptile-database.org/ (accessed August 2025).

A Rare Incidence of Glossy Ibis (*Plegadis falcinellus*) Nesting on Ground in the Wetlands of Jamnagar, Gujarat, India

Yashodhan Bhatia[1*], Mehul Bhadania[2], Satish Pande[3]

[1*]Corresponding author, Bhatia Stores, Old Station Road, Nr. Teen Batti, Jamnagar 361001 jamnagarbirds@gmail.com.

[2]53/A, Ambavijay Society, Off Sarusection Road, Jamnagar 361008: mehulbhadania@gmail.com.

[3]Director, Ela Foundation, Pune; pande.satish@gmail.com

Citation: Bhatia Yashodhan, Bhadania Mehul, Pande Satish. (2025). A Rare Incidence of Glossy Ibis (*Plegadis falcinellus*) Nesting on Ground in the Wetlands of Jamnagar, Gujarat, India. *Ela Journal of Forestry and Wildlife*. 14(4): 1862-1864

Date of Publication: 31 December 2025

ISSN 2319-4361

- **Name of Species: -** Glossy Ibis
- **Scientific Name: -** *Plegadis falcinellus*
- **Status: -** Least Concern
- **Date of sighting: -** 22 August 2019 to 05 September 2019.
- **Time of sighting: -** 7am to 11 am during each visit.
- **Weather parameters: -** Cloudy during monsoon season.
- **Number of times sighted: -** Three visits in fortnight.
- **Number of birds: -** Multiple
- **Locality: -** Danadada wetland area, Navagam Ghed, Jamnagar, Gujarat (22.513473°, 70.081416°)
- **Habitat description: -** Freshwater marsh with grass covered ground outside saltpans.
- **Distance from human habitation: -** Approximately 3 km.
- **Bird Behaviour: -** Glossy Ibises are commonly reported nesting on trees in wetlands and agricultural habitats (Chauhan et al, 2024). However, we recorded them nesting on the ground, a phenomenon that we had never observed earlier. It could be an adaptive response to the availability of suitable nesting sites in wetlands of Jamnagar. At the study site, ibises were active and busy during the mating season.
- **Threats to the habitat: -** Roaming feral dogs. No threat to habitat from humans.
- **Photographs: -** Attached.

Previous records of ground nesting from India: - None from the study site or to the best of our knowledge, from India. Attempted nesting on ground by Glossy Ibis is reported from USA (Miller et al, 1978) and Spain (Afan et al, 2018) previously. To the best of our knowledge, this is the first report of ground nesting attempt by Glossy Ibis from Gujarat and probably from India.

Ground nest of Glossy Ibis on a clump of sedge grass in a wetland.

Addendum

During a field study in August and September 2019, we documented the courtship and early nesting behavior of Glossy Ibises (*Plegadis falcinellus*) within a seasonal freshwater marsh in Jamnagar, Gujarat. Following the monsoon rains, the habitat was characterized by a high-density emergence of stiff sedge grass (*Cyperus* spp.). The ibises demonstrated a preference for a specific micro-habitat, selecting elevated clumps of these sedges as structural foundations for their nests. Construction behaviour involved the horizontal arrangement of dried sedge twigs gathered from the immediate vicinity. These twigs functioned beyond mere structural components; they were utilized as "nuptial gifts" in a symbolic object exchange that occurred both preceding and following copulation.

Despite these active breeding displays, the colony faced persistent pressure from anthropogenic sources. On 5th September 2019 we observed multiple feral dogs (*Canis familiaris*) invading the nesting area. The ibises initially responded with a low-intensity avoidance strategy, walking away to maintain a safe distance rather than taking flight. However, after repeated incursions throughout the day, the perceived risk evidently reached a critical threshold. Although nest construction was nearly complete, egg-laying had not yet occurred. By the following morning, the site was entirely vacated, where we witnessed a total and abrupt abandonment of the colony. This sudden desertion suggests that when faced with a high risk of ground-level predators, the ibises chose to abandon their unusual ground nests and seek safety elsewhere to ensure their own survival for future breeding seasons.

References

- Afán, Isabel & Máñez, Manuel & Diaz-Delgado, Ricardo. (2018). Drone Monitoring of Breeding Waterbird Populations: The Case of the Glossy Ibis. Drones. 2. 42. 10.3390/drones2040042.
- Chauhan, Aditya & Dalal, Sonu & Majumdar, Pradyumna. (2024). Recent nesting of Glossy Ibis Plegadis falcinellus at two different sites in the Jhajjar District, Haryana, India.. Indian BIRDS. 20. 89-90
- Miller, Lynne M. and Burger, Joanna (1978) "Factors Affecting Nesting Success of the Glossy Ibis," The Auk: Vol. 95: Iss. 2, Article 16. Available at: https://digitalcommons.usf.edu/auk/vol95/iss2/16

Glossy Ibises mating on the ground nest.

The colony of Glossy Ibises was disturbed by feral dogs leading to abandonment of the site by the ground nesting ibises.

ISSN 2319 - 2461
Journal for Private Circulation only

Table of Contents

Cover : Glossy Ibises on a ground nest/Yashodhan Bhatia
Back Cover : Glossy Ibis/Yashodhan Bhatia

You can contribute to conservation : Please send your reports and research papers to the Editor EJFW (ejfwmanuscript@gmail.com)
Ela Foundation
Nature Conservation through Education, Research and 'One Health'