

Addressing the taxonomic and geographical shortfall for amphibians and reptiles using specimen data from the collection of Bombay Natural History Society, Mumbai, India.

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# BNHS Collections at a glance

- **Second oldest** natural history collections in India.
- A **National Repository** designated by MoEFCC under Biodiversity Act 2002. First and only NGO designated as a repository.
- **Over 1,50,000 specimens**, some are over 150 years old.
- Specimens' geographic range includes present-day India, Pakistan, Afghanistan, Bangladesh, Nepal, Bhutan, Myanmar, Sri Lanka, Iraq and Iran.
- Specimen includes **many critically endangered and extinct species**

Sr. No.	Taxon	Number of type specimens	Total
1	Mammals	06	20000
2	Birds	65	30000
3	Bird Eggs	-	5554
4	Reptiles	242	8000
5	Amphibians	489	7000
6	Fish	15	1500
7	Insects	245	70000
8	Scorpions and spiders	20	700
9	Other Invertebrates	10	5000
		Total (approx.)	150754

# Project objectives

- To resolve taxonomic ambiguities of Indian reptiles and amphibians and understand distribution using morphological, geographic and ecological information.
- Create a digital database collating information about collector, identifier, repository details, field notes, published literature etc.
- Map species distribution based on species occurrence records.
- Create database linking species-specific images with the catalogue to help future researchers.



# Methodology

- Identifying and sorting specimens.
- Extracting species occurrence records from verbatim locations in catalogues.
- Visiting national museums.
- Photographing specimens & creating database.
- Raw data from registers into excel sheets and inter-related tables.





# Activities

- Workshops – Taxonomy (15 participants), specimen photography (7 participants), image processing and georeferencing (10 participants)

- Visited Zoological Survey of India museum, Kolkata and examined various type-specimens and interacted with field experts regarding future prospects of taxonomic research.



# Activities

- Updating taxonomy of species complexes based on geographic and morphometric data with the help of the latest publications

- Boiga* group - 23 specimens
- Hemidactylus brookii* complex - 215 specimens
- Hemidactylus maculatus* complex – 49 specimens
- Lycodon* group – 230 specimens
- Oligodon* group – 214 specimens
- Platyceps* group – 25 specimens
- Sarada* & *Sitana* group – 67 specimens



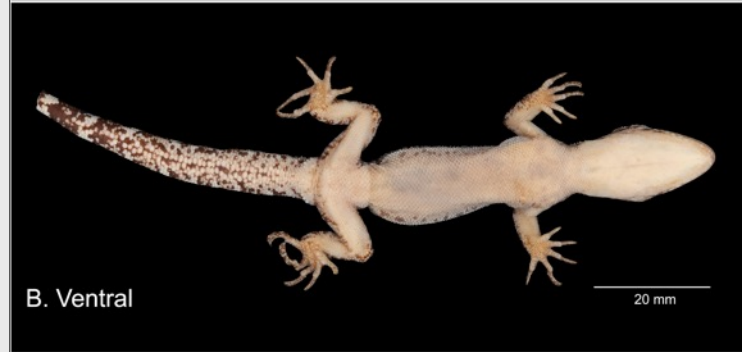
# Achievements

- Created reptile species checklist of specimens in the collection of BNHS. (**565 species**).
- Created amphibian species checklist of specimens in the collection of BNHS. (**243 species**).
- Published updated catalogues of type specimens in GBIF with over **780** occurrence records.
- Published catalogue of sea snakes with over **275** occurrence records for 31 species.
- Published occurrence records of over **9,500** reptile and amphibian specimens **collected across 23 countries housed in the collection of BNHS**.
- Cleaned and organized the digitized data incorporating the latest taxonomic changes and geo-referenced localities wherever possible.



***Cyrtodactylus nagalandensis***

Paratype: BNHS 2254



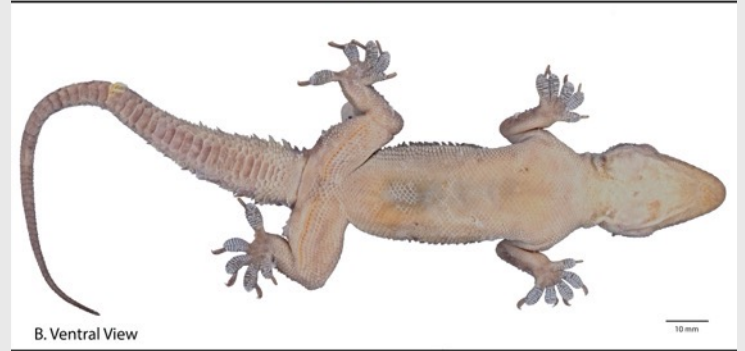
***Smithophis atemporalis***

Paratype: BNHS 3525



***Hemidactylus kangerensis***

**Holotype** BNHS 2484, adult male, in a forest rest house near Kailash caves, Kanger Valley National Park, Bastar District, Chhattisgarh, India (18.8411708, 81.9973108, 464 m). Collected on 2 December 2016 by Harshal Bhosale and Zeeshan Mirza.



*Cnemaspis amboliensis*  
HOLOTYPE BNHS 2458



*Cnemaspis amboliensis*  
HOLOTYPE BNHS 2458



# Project impacts and data relevance

- The project significantly highlighted the amount of raw paper documented data that lies in museum registers, especially for species considered data deficient.
- Digitized and published occurrence records can be used for distribution range mapping & conservation assessments.
- Images and observations of museum specimens will help in the proper taxonomic identification of cryptic species complexes.





# Benefits of getting involved in GBIF

Overall understanding of the significance of collated data capture and sharing improved through BIFA workshops.

Interaction with other participants and mentors helped in learning specific tools and prospects for future collaborations.

Understanding the GBIF platform and frameworks like *Darwin core* helped in designing long-term digitization projects and collaborations with other regional museums.

Publishing data through GBIF will help in international recognition and further use of information necessary for conservation policy.



# Potential of data use by government agencies

- A web-based Geographic Information System (GIS), operational since 2014, developed and maintained by FSI, has been created as an online Decision Support System (DSS). It uses 15 spatial layers and helps in informed and unbiased decisions on the diversion of forest land based on qualitative and administrative characteristics of forests.
- The biodiversity data has the potential to evolve as a data-driven decision support system for biodiversity conservation and management. The availability of a wealth of spatial and temporal species distribution data and the ability to continuously aggregate such data through crowd-sourced participation make it an attractive platform to stakeholders (Vattakaven, T. et al., 2016).



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**THANK YOU**

GRACIAS  
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SHUKURIA  
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