"TAXONOMIC IDENTIFICATION OF REPTILES"

Project Work By

MOUSOOFA PARVEEN P.P

AB20Z00034

Under the guidance of

Dr.SOJA LOUIS

Head of the Department, Department of Zoology,

St. Teresa's College (Autonomous), Ernakulam

Kochi-683011

Submitted to St. Teresa's College (Autonomous) Ernakulam

Affiliated to Mahathma Gandhi University, Kottayam in partial fulfillment of requirement for the degree of Bachelor in Science in Zoology

2022-2023

CERTIFICATE

This is to certify that the project work entitled “TAXONOMIC IDENTIFICATION OF REPTILES” is an authentic record of the project work submitted by MOUSOOFA PARVEEN .P.P (Reg. AB20ZOO034) , during the academic year 2022-2023 under my supervision and guidance and partial fulfillment of the requirement of the degree Bachelors of science in Zoology, St.Teresa's college (Autonomous), Ernakulam affiliated to Mahatma Gandhi University Kottayam .

Dr. Soja Louis
Head of the Department
St. Teresa's college (Autonomous)
Ernakulam

Examiners

1.
2.

DECLARATION

I hereby declare that project work entitled "TAXONOMIC IDENTIFICATION OF REPTILES" submitted to St.Teresas college (autonomous), Ernakulam affiliated to mahatma Gandhi University, Kottayam in the partial fulfillment of the requirements of Bachelor Of Science Degree In Zoology, is a record of original project done by me under the guidance and supervision of Dr. Soja Louis, Assistant Professor of Department of Zoology, St.Teresas college, (Autonomous) Ernakulam.

Name : Mousoofa Parveen P.P.

Reg.No. : AB20ZOO034

Signature

ACKNOWLEDGEMENT

I, Mousoofa Parveen P. P. is very much indebted to Dr. Soja Louis, my teacher guide for this work. I whole heartedly acknowledge, my teacher guide's keen interest, patience, guidance, unfailing encouragement and invaluable suggestions during the entire course of my work, which helped me accomplish this task.

I take this opportunity to express my heartfelt gratitude to Dr.Venkittaraman C. Former Director of “Zoological Survey of India "; also a biologist, who identified reptilian specimens in our museum.

Last but not least I extend my gratitude to all teaching and non-teaching staff of the Department Of Zoology for helping me in this project.

Above all I thank to god almighty for his blessings and showing me the way throughout the journey. Also, my sincere appreciation to my parents for always standing by me.

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SYNOPSIS

Taxonomic identification is the recognition of identity or essential character of an organism. They are organized as written descriptions of characteristics of similar species with their pictures to identify unknown organisms. In this project work on "TAXONOMIC IDENTIFICATION OF REPTILES" the taxonomic identification of 29 species coming under the phylum reptiles, along with their cleaning and neat labelling is done. According to Wild Life Protection act, there is restriction in the direct collection of reptilian specimens, so observing the reptilia available at the museum and their classification provides detailed information of the specimens that may be useful for future reference.

INTRODUCTION

Reptiles, as most commonly defined, are the animals in the class Reptilia. As of March 2022, the reptile database includes about 11,700 species. In the traditional Linnean classification system, birds are considered a separate class from reptiles. However, crocodilians are more closely related to birds than they are to other living reptiles, and so modern cladistic classification systems include birds within Reptilia, redefining the term reptile altogether in favour of the clade Sauropsida, which refers to all amniotes more closely related to modern reptiles than to mammals. The study of the traditional reptile orders, historically combined with that of modern amphibians, is called herpetology.

Class Reptilia is made up of four orders: Squamata, Testudines, Crocodilia, and Rhynchocepahilia. Each order is further divided into suborders, families, genera, and species. Squamata are characterised by their scaled skin, which is shed periodically, and a movable quadrate bone that allows the maxilla to open wide relative to the rest of the skull. The order is divided into three suborders: Lacertilian (the lizards); Serpentaria (the snakes); and Amphisbaena (the worm lizards), although some classifications place Amphisbaena within Lacertilian. Testudines, sometimes known as Chelonia, are the turtles, tortoises, and terrapins.

Rhynchocephalia is a primitive order of lizard-like reptiles that includes only one living species. Crocodylia, an order of large predatory, semi-aquatic

reptiles, is divided into three families: Crocodylidae (the true crocodiles), Allugatoridae (alligators), and Gavialidae.

The earliest known proto-reptiles originated around 312 million years ago during the Carboniferous Period, having evolved from advanced reptiliomorph tetrapods that became increasingly adapted to life on dry land. Modern non-birding reptiles inhabit all the continents except Antarctica.

Reptiles are tetrapod vertebrates, creatures that either have four limbs or, like snakes, are descended from four-limbed ancestors. Unlike amphibians, reptiles do not have an aquatic larval stage. Most reptiles are oviparous. Although several species of squamates are viviparous, as were some extinct aquatic clades, the foetus develops within the mother, using a placenta rather than an eggshell. As with amniotes, reptile eggs are surrounded by membranes for protection and transport, which adapts them to reproduction on dry land.

As per the wildlife (protection) act, there is a ban on collecting reptile specimens directly from certain conserved areas, so a further study on reptiles cannot be done directly. So by identifying and classifying the specimens available at our museum, we can study more about their unique characteristics whenever possible. Thus, studying more about their classification helps us know and understand more about the diversity of reptiles and their importance to nature.

LITERATURE REVIEW

Studies conducted by Bohm et al., (2013) reveals that nearly one in five reptilian species are threatened with extinction and almost one in four assessed species are data deficient. Data deficiency in reptiles is higher than that of bird and mammmal species. In particular for tropical reptiles and those with fossorial habits recent collapses of snake diversity have been reported with rippling effects to the ecosystem by Zipkin et al., (2020)

Goldingay (2015) reviewed home range studies for Australian terrestrial vertebrates between 2001-2012 and only 19% out of 150 papers pertained to reptiles even though Australia has over 860 native reptiles, in comparison, 68% of studies were on mammals which only correspond to 16% Australian's land species.

Stephanie (2019) worked on venomous snakes a neglected hazards for outdoor workers they explained how to prevent venomous snake bites in the paper.

The monumental works on Indian reptiles are " The reptiles of British India " by Ganther (1864)' fauna of British India" Reptila and 'Batrachia' by Boulenger (1890) and Smith. These fundamental biological differences suggest that ecological and physiological studies of reptiles should complement rather than merely supplement parallel studies of other vertebrates.

The work of Smith stood the test of time and forms the standard work on the subject. Further contributions were made by Tiwari and Biswas (1973). Tikedar

and Sharma (1992) worked on Geographical distribution patterns of amphibians in the western ghats. The distribution status and problems of mugger crocodile are well documented by Vijayakumar et al., (1999). Momin et al., (1990;1992) and Shah et al., (1991) studied parasites of reptiles in detail. Ramachandran and Shah (1986) and Naik and Vinod (1997) made attempts to study the morphology of *Mabuya carinata* and *Lygosoma lineatum*.

Vasu (1949) remarks on aggressive demonstration by Russell's viper and Urfi (1997) successful in breeding of the Indian python. Songit et al., worked on biodiversity study on Vasanda National Park. In connection with Gujarat ecological education and research foundation. Ashley and Robinson in 1996 worked on the road mortality of amphibians, reptiles and other wildlife on the long point causeway.

Baldwin, Marchand and Litvatis in 2004 worked on terrestrial habits use by nesting painted turtles in landscapes with different levels of fragmentation. Benedict and Billeter in 2004 worked on discarded bottles as a cause of mortality in small vertebrates. Sergel, in 1986 worked on Ecology and conservation of an endangered rattle snake, *Sistrurus catenatus*. Raymond Hoser worked on a project which is a new species of fresh water crocodile from the bird's head region of New Guinea. Akbtar and Tiwari (1991) Extension of range of the black cobra *Naja naja* Oriana. Based on the sounds of frogs and toads Bogert Charlesm worked on sounds of North American frogs.

METHODOLOGY

Materials required:

Formalin, Bucket, Water, Gloves, Bleach, Scale, Thread, Bottle of dry and wet specimens.

Method:

24 specimens placed in the museum grouped under phylum reptelia were observed. On the basis of their morphological features, specimens are identified and classified into different phylum. First of all, the specimens were taken out of the museum. Then their external features were observed and scientific measurements were made. The dry specimen were dipped into bleach solution made with 3 spoons of bleach in water for certain hours and were rubbed with a brush for further cleaning and old formalin solution of wet specimen were removed and fresh formalin solutions were added in the ratio 9:1 after cleaning the specimen bottles. The specimens were then put back into the bottle. Finally labels were tagged on each specimen bottles which contain information on their kingdom, phylum, class, order, family, genus and species.

OBSERVATION AND RESULT

1. KRAIT

KINGDOM : Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

Family: Elapid snake

GENUS: *Bungarus*

DESCRIPTION:

The body colour varies from a dark steely blue black to a pale faded blueish grey. The average length is 1 metre for subcaudal scales after the anal scales are not divided. It has large hexagonal scales running down its spine; the white cross bands are more prominent near the tail region; the male is larger than the female and also has a longer tail.

HABITAT

Inhabits a wide variety pf habitat in its range it is found in fields, low scrub jungles as well as inhabited areas. Their fondness for rodents leads them to take up residence in rat holes, termite mounds brick piles and also inside houses. It is fond of water and is frequently found in it or near it.

DISTRIBUTION

Penninsular India from Sindh (Pakistan) to the west Bengal plains it occurs throughout south India and sri lanka

2. UROMASTIX

KINGDOM: Animalia
PHYLUM: Chordata
CLASS: Reptilia
ORDER: Squamata
FAMILY: Agamidae
GENUS: Uromastyx
DESCRIPTION

Size ranges from 25cm to 91cm lizards colors change according to the temperature and season spiked tail is muscular and heavy able to be swing at an attacker with great velocity

HABITAT

Common kraits are solitary and can be active both during the day and night time during the day they are sluggish and generally docile they often hide in rodent holes loose soil or beneath debris so are rarely seen

DISTRIBUTION

Distributed from Sindh to west Bengal throughout south india and srilanka it has also been recorded in Afghanistan Bangladesh and Nepal

3. HYDROPHIS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Elapidae

GENUS: Hydrophis

DESCRIPTION

The scales on the thickest part of the body have rounded or pointed tips and are imbricate six or seven maxillary teeth are found behind the fangs

DISTRIBUTION

Found in the Indian ocean it is also found in Pakistan,srilanka , india etc the species has been reported to live in waters as deep as 50m

HABITAT

Sea snakes are mostly confined to the warm tropical waters of the Indian ocean and the western pacific ocean, feeding on fishes

4. COBRA

KINGDOM:Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Elapidae

GENUS: Naja

DESCRIPTION

A full grown king cobra is yellow, green, brown, or black they usually also have yellowish or white crossbars or chevrons the belly may be uniform colour or ornamented with bars

HABITAT

Found pbyredominantly in forests from india through southeast asia to the Philippines and Indonesia

DISTRIBUTION

Northern India it has been recorded in garhwal and kumaenr and in the Shivalik and terai regIons of uttarakhabnd and uttar Pradesh

5. ECHIS CARINATA

KINGDOM:Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Viperidae

GENUS: Echis

DESCRIPTION

Ranges between 38 and 80cm in total length but usually no more than 60cm head distinct from neck, snout, very short and rounded

HABITAT

Found on a range of different substrates including sand rock soft soil and in scrublands

DISTRIBUTION

Found in parts of the Middle East and central Asia and especially the Indian subcontinent

6. CHAMAELON

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Chameleonidae

GENUS: Chameleo

DESCRIPTION

The body is laterally compressed the tail is sometimes curled and the bulged eyes move independently of one another

HABITAT

Rain forest and deserts of Africa

DISTRIBUTION

Middle east, southern India, Srilanka, western Indian ocean

7. PHRYNOSOMA

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Phyronosomatidae

GENIUS: Horned

DESCRIPTION

A genius of North American lizards and th e type genus of the family phrynosomatidae

HABITAT

Xeric habitats of the southwestern united states and the Mexican plateau

DISTRIBUTION

Across the United States and Mexico

8. NAJA NAJA

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Elapidae

GENIUS: Ophiophagus

DESCRIPTION

Presence of hood and the spectacle mark on the back of the hood

HABITAT

Regions throughout Africa, southwest Asia, south Asia and southwest Asia

DISTRIBUTION

Species is native to India, Pakistan, Bangladesh, Srilanka

9. DRYOPHIS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Colubridae

GENIUS: Python

DESCRIPTION

Snout pointed, terminating in a dermal appendage which is shorter than the eye and formed entirely by the rostral

HABITAT

Found in low bushes , shrubs and trees in lowland forest terrain at elevations up to about 1000 meters particularly neat streams and often found near human settlements

DISTRIBUTION

In southeast asia

10. TROPIDONOTUS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Natrix

FAMILY: Polychrotidae

GENIUS: Noorps

DESCRIPTION

Adult male as indicated by everted hemipences and a well developed dewlap snout vent length 59.0 mm no enlarged scales , dorsal scales lateral to middorsal series abruptly larger than granular lateral scales

HABITAT

Ponds lakes drains and paddy fields

DISTRIBUTION

India Afghanistan china throughout south and south east asia

11. MABUYA

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Scincidae

GENUS: Mabuya

DESCRIPTION

A genis of long tailed skinks restricted to species from various Caribbean islands

HABITAT

Restricted to specirs fron various caribean islands

DISTRIBUTION

Worldwide in the tropics

12. ERYX CONICUS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Boidae

GENUS: Gongylophis

DESCRIPTION

Rough scaled sand boa is a species of non-venomous snake

HABITAT

Sandy tracts of central and southern India the Punjab Kachchh and Sind

DISTRIBUTION

Southern Asia

13. TESTUDO ELEGANS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Testudines

FAMILY: Testunidae

GENIUS: Geochelone

DESCRIPTION

Carapace is very convex with dorsal shields often forming humps lateral margins are nearly vertical the posterior margin is somewhat expanded and strongly serrated

HABITAT

Inhabits dry areas and scrub forest

DISRTIBUTION

Native to india, pakistan and sri lanka

14. VARANUS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Varanidae

GENIUS: Monitor

DESCRIPTION

Reported to grow to 3 meters in length but almost adults are 1.5 meters long at most individual have a black temporal band edged with yellow that extends back from each eye

HABITAT

Seen on river banks and in swamps

DISTRIBUTION

Widely in the indian subcontinent as well as parts of southwest asia and west asia

15. LYCODON

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Colubridae

GENUS: Lycodon

DESCRIPTION

A species of colubrid snake which is commonly found in the indo Australian archipelago

HABITAT

Terrestrial

DISTRIBUTION

Cambodia, Thailand, Vietnam, Singapore.

16. NATRIX

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Colubridae

GENIUS: Natrix

DESCRIPTION

A Eurasian semi aquatic venomous colubrid snake

HABITAT

Open woodland and edge habitat such as field margins and woodland borders

DISTRIBUTION

Norway , swedan, finland, France, Belgium.

17. ENHYDRINA VALAKADEEN

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Elapidae

GENUS: Enhydrina

DISTRIBUTION

A highly venomous species of sea snake common throughout the tropical indo pacific

DESCRIPTION

Hook nosed sea snake

HABITAT

Aquatic, predator

18. PTYAS MUCOSUS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptlia

ORDER: Ptyas

FAMILY: Colubridae

GENUS: Ptyas

DESCRIPTION

Shiny black scales on their back and a light colored belly and their throat and chin are white

HABITAT

Oppen terrain adjacent to forested areas

DISTRIBUTION

Iran, Afghanistan, Pakistan, india and srilanka

19. TURTLE

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Testudines

FAMILY: Cheloniidae

GENUS: Chelonia

DESCRIPTION

Body encased in a bony shell, turtle shell has a top (carapace) and a bottom (plastron)

HABITAT

Bodies of water ranging from small ponds and bogs to large lakes and rivers

DISTRIBUTION

Southeastern North America and south Asia

20. COBRA

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Elapidae

GENIUS: Naja

DESCRIPTION

A full grown king cobra is yellow, green, brown or black they usually also have yellowish or white crossbars or chevrons the belly may be uniform in colour or ornamented with bars the throat is light yellow or cream coloured

HABITAT

Forest

DISTRIBUTION

India through Southeast Asia to the Philippines and Indonesia

21. UROPELTIS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Uropeltidae

GENUS: Uropeltis

DESCRIPTION

Non venomous shield tail snakes

HABITAT

Western Ghats on the Cochin side of the Anaimalai hills

DISTRIBUTION

Tamilnadu, sirumalai

22. DRACO DUSSIMAIRI

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Agamidae

GENUS: Draco

DESCRIPTION

Brown with patches of grey that match the pattern of tree bark can change its colour to a limited extent

HABITAT

Western ghtats and hill forest

DISTRIBUTION

Karnataka, kerala, tamilnadu, goa

23. CALOTES

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Agamidae

GENUS: Calotes

DESCRIPTION

Blood suckers due to their red heads

HABITAT

Garden and forest

DISTRIBUTION

India and srilanka

24. VIPER RUSELLI

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Viperidae

GENUS: Daboia

DESCRIPTION

The venter is white, whitish, yellowish or pinkish often with an irregular scattering of dark spots

HABITAT

Open grassy bushy areas scrub jungles

DISTRIBUTION

India Srilanka Bangladesh Nepal and Pakistan

25. GEOMYDA

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptlia

ORDER: Testudines

FAMILY: Geomydidae

GENUS: Geomyda

DESCRIPTION

Carapace is elongated color varies from yellow brown to gray brown marginal scutes are strongly serrated

HABITAT

Forest wooded mountain area and wetlands

DISTRIBUTION

China and vietanam

26. TYPLOPS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Typhlopidae

GENIUS: Typhlops

DESCRIPTION

Body divided into head neck trunk and tail body is elongated cylindrical

HABITAT

Underground in burrows

DISTRIBUTION

Ghana guinea ivory coast

27. LYGOSOMA

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Scincidae

GENIUS: Lygosoma

DESCRIPTION

Supple skinks or writhing skinks stubby legged animals move snake like but more slowly and more awkwardly

HABITAT

Lowland forest

DISTRIBUTION

China hongkong Cambodia

28. HEMIDACTYLUS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Squamata

FAMILY: Gekkonidae

GENUS: Hemidactylus

DESCRIPTION

Scaly vertebrates' small head short neck long body and tail

HABITAT

Nocturnal animal

DISTRIBUTION

South asia Africa America

29. CHELONIAS

KINGDOM: Animalia

PHYLUM: Chordata

CLASS: Reptilia

ORDER: Testudines

FAMILY: Chelonidae

GENUS: Chelonias

DESCRIPTION

Toothless oviparous quadrupedal pentadactyl reptiles

HABITAT

Shallow areas

DISTRIBUTION

India pacific and Atlantic oceans

DISCUSSION

One in five reptilian species are threatened with extinction and almost one in four assessed species are data deficient. Data deficiency in reptiles is higher than that of bird and mammmal species.Recent collapses of snake diversity have been reported with rippling effects to the ecosystem by zipkin (2020)

Australian terrestrial vertebrates between 2001-2012 and only 19% out of 150 pappers pertained to reptiles even though Australia has over 860 native reptiles, in comparison, 68% of studies were on mammals which only correspond to 16% Australian's land species.

The fundamental biological differences suggest that ecological and physiological studies of reptiles should complement rather than merely supplement parallel studies of other vertebrates.

Tikedar and Sharma (1992) worked on Geographical distribution patterns of amphibians in the western Ramachandran and Shah (1986) and Naik and vinod (1997) made attempts to study the morphology of mabuya carinata and lygosoma lineatum.

Urfi, A.J (1997) successful in breeding of the Indian python

Songit.S worked on biodiversity study on vasanda national park. In connection with Gujarat ecological education and research foundation.

CONCLUSION

Taxonomic keys are used for the taxonomic identification where they provide the unique characteristics of species with written descriptions and pictures. They are also capable of conveying natural variation in the morphology of species not the small, yet characteristic morphological features of a species. Taxonomic identification is less time consuming and as they help students by providing necessary information on the specimens referring internet and book sources. Eventhough many species of Reptilia observed in the museum were originally distributed all over the India. So, these may have become invasive. A species is regarded as invasive if it has become introduced to a location, area or region where it did not previously occur naturally and becomes capable of establishing a breeding population in the new location.

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