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An analysis on characteristics, lifestyle, and habitat of Reptiles

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Abstract

Background The world's most endangered vertebrate species include amphibians and reptiles. However, little is known about how roadkills on tertiary highways influence them or if the structure of the surrounding terrain may account for patterns in roadkill. Our study's objective was to determine if open-access remote sensing data might be used to depict spatial patterns of amphibian and reptile deaths on secondary highways using a large-scale citizen science technique. Using a citizen science app, we tracked amphibian and reptile road deaths over 97.5 km of tertiary roads in eastern Austria over the course of two seasons. These roads included farm, municipal, and interurban roads as well as bicycle lanes. Using the region's open access land cover classifications, the surrounding landscape was evaluated (Coordination of Information on the Environment, CORINE). Kernel density estimation (KDE+) was used for hotspot analysis. Conditional probabilities and general linear models were used to analyse the relationships between different land cover classes and amphibian and reptile road deaths (GLM). A large-scale citizen science monitoring project's potential cost-efficiency was also calculated. Results Eight different species of amphibians and reptiles totaling 180 were killed on highways, mostly on farm roads. For authorities attempting to reduce road deaths, KDE+ analysis indicated a large grouping of amphibians and reptiles that were killed on the road. In general, places with a high concentration of amphibian and reptile road deaths were close to vineyards, residential areas, and agricultural land. The most often discovered road-killed species, the grass snake, common toad, and green toad, were identified as road-kills specifically near to their preferred habitats using conditional probabilities and GLMs. Only when more than 400 km of road are monitored did a citizen science technique prove to be more economical than professional researchers. Conclusions our results indicated that a citizen science strategy coupled with publicly accessible remote sensing data might be a cost-effective way aiming to discover and monitor amphibian and reptile road-kill hotspots on a bigger scale.

Keywords: Reptiles, Habitant, Diversity, Wildlife trade, Species Production

1. Introduction

Especially in tropical areas like Southeast Asia where they are abundant and diverse, reptiles play a significant role in ecosystem function via gene spread, nutrient cycling, trophic action, and ecosystem engineering. Malaysia is a megadiverse nation in Southeast Asia that is situated in a biodiversity hotspot. Reptiles, including at least 191 species of snakes, 174 lizards, 24 turtle species, and three crocodiles, make up a significant portion of Malaysia's biodiversity. Reptile research in Malaysia spans a broad variety of areas in the biological sciences, including but not limited to biodiversity.

While conventional surveys continue to provide a large number of new findings, the introduction of molecular methods has revitalized several domains, particularly in systematics, ecology, and evolution. This shows that Malaysia's biodiversity is still not fully known. This dearth of knowledge is made worse by widespread and severe habitat destruction that threatens numerous species, some of which have not yet been identified and others of which are doomed to extinction. Therefore, we believe it is appropriate to provide the first comprehensive overview of Malaysian reptile research two decades after the turn of the twenty-first century. We give an analysis of research patterns via a thorough assessment of the literature to identify trends and biases that may be used to enhance next research and conservation projects.

1.1.Life Cycle and Life History of Reptiles

Amazingly diverse reproduction strategies are often revealed by the life histories of reptiles. Some species of reptiles are annuals, meaning they develop, reproduce, and pass away within a year or, at most, two years (as in side-blotched lizards [Utastansburiana]). Some species, like loggerhead sea turtles (Carettacaretta), are long-lived and take 25 or more years to reach sexual maturity. They may live for more than 50 years. There are many species in between these two extremes. While some reptiles are live-bearers, others lay eggs. Some species only lay one or two eggs, while others lay a hundred or more at each nesting occasion. Some reptiles reproduce continuously, whereas others only breed occasionally or wait two or more years between breeding cycles.

1.2.Wildlife Trade in Reptiles

Since the beginning of recorded history, mankind have utilised reptiles as food, pets, and sources of leather. Every year, many crocodiles, turtles, snakes, and lizards are caught in the wild and sold as pets, food, or skins. For rural hunters who coexist with and exploit animals as well as the companies that employ reptiles as commodities for trade, this worldwide commerce is worth many millions of dollars every year. About 70% of all commerce in reptiles are snakes and lizards, and in the 21st century, most of these trades come from southeast Asia.

The issue of whether an obscenely enormous animal trade is sustainable has been highlighted by the trade in reptiles. Based on thorough examinations of trade patterns and the biology of the species, the trades in tegu lizards monitor lizards (Varanus spp.), many python species, and a variety of snakes seem to have many sustainable qualities. The species that are traded in big quantities often have broad ranges, quick or moderate life histories, and are ecological generalists. Additionally, they are not pursued throughout their full range.

1.3.Importance

However, they have a significant economic value for food and ecological services (like insect control) at the local level. They are valued nationally and internationally for food, medicinal products, leather goods, and the pet trade. Reptiles do not have a high commercial value in the agriculture industry as a whole compared to fowl and hoofed mammals.

While this influence is sometimes disregarded since reptiles only contribute locally, it is true that certain temperate and many tropical places are where they have the largest economic impact. It is common practice not to give any vertebrate that controls pests a monetary value. The significance of rodent management has been repeatedly shown when populations of rodent-eating snakes are devastated by snake harvesting for the leather trade. Nevertheless, many lizards control insect pests in homes and gardens; snakes are key rodent predators. Such snakes are absent, allowing rodent numbers to soar. In many tropical regions, it is also common practise to frequently collect turtles, crocodiles, snakes, and lizards for local cuisine. The pressures placed on local reptile populations by commercial harvesting often outweigh the capacity of the species to reproduce normally to replace itself. The bigger individuals of most species are often the ones that are targeted for harvesting; these individuals are frequently the adult females and males in the community; their removal drastically decreases the breeding stock and causes a rapid drop in population.

The widespread extirpation, or localized extinction, of numerous crocodilian species occurred as a result of the overharvesting of crocodiles for the leather business in the 1950s and 1960s. Additionally, the number of surviving populations decreased almost entirely globally. Since then, restrictions on a national and global scale have significantly decreased harvests, and aggressive conservation and management strategies have enabled many crocodilian populations to recover. Crocodiles may now recover their position as top predators in many aquatic environments thanks to controlled harvesting, which also gives the leather industry access to an appropriate supply of skins. The American alligator (Alligator mississippiensis), which was on the verge of extinction in the southeastern United States in the late 20th century, has since recovered, proving that effective management of reptile populations is achievable provided it is carefully monitored.

1.4. **Objective of the study**

- The second evenhanded of the ongoing review was to examine the local area construction of reptiles opposite their miniature territory necessities.
- The third and the last goal was to concentrate exhaustively the eco science of one the most well-known and inescapable, yet least joined in, agamid reptile the Fan-throated Reptile.

2. Literature Review

Boulenger conducted the first thorough research of the reptiles in India (1887; 1890). As a result, a few studies have been conducted on the systematics, regular history, and habitat of Indian reptiles (Smith, 1935; Daniel, 1983; Murthy, 1985a, 1985b, 1990a, 1990b; Tikader and Sharma, 1992). Smith's monograph from 1935 contains observations on the Indian species' systematics and other natural features. Despite this, Daniel (1983) intriguingly published a book on the common histories of the bulk of the important species of reptiles in India. The data available in Smith's monograph are repeated in Murthy's distributions (1985-1990). The useful information included in Tikader and Sharma's book (1992) is a repetition of Smith's work as well, however they provided delineations of select varieties of reptiles. Additionally, a series of papers describing new species, systematics, and the historical development of a few Indian reptiles have been published (Annandale, 1904-1921).

Since reptiles in biodiversity are startlingly different from one another, it is important to have a quick knowledge of the context in which they are anticipated to be protected. A successful preservation effort needs specific information about species dispersion, systematics, and biology. A evaluation of the risks that are disseminated to children is also necessary. (2013) (Bohm et al.)

The zoogeography of the herpetofauna, which includes information on both land and aquatic organisms as well as reptiles, is found in clear-cut regions of New Guinea (Allison, 1996).

According to Ananjeva et al. (1997), the reptiles of Mongolia exhibit variation alongside their habitat, while the reptiles of Iran exhibit some climatic change (Anderson 1999). Varieties, applications, and beginnings of reptile cranial kinesis according to growth and living space change (Arnold E.N. 1998). All living things are connected to the ecological factors that affect them in one of two ways: physically, such as heat, light, and moisture, and naturally, such as predation, food availability, and competition. Reptiles have a role in this framework, but it may be difficult to determine their impact on the biological system since the bulk of them live strange lifestyles. In general, warm biology, population nature, local area biology, territories, and examples of dispersion are studied in relation to reptiles' environments. The majority of perceptions have been produced casually, sometimes by non-herpetologists, and the translations made of them are not accurate. Other perceptions have been made while being imprisoned in unnatural conditions (Mattison, 2003).

The majority of the time, how networks are designed leads to transformational developments that occurred in the past. The historical context of squamate environments, reptile identification, authentic comparisons, and assessments of affected squamates globally in relation to dietary change in squamate developmental history are discussed (Vitt et al. 2003). The outcome of a lizard's utilisation of its microhabitat and territory during a natural inspection. Different microhabitats and environments with distinct biotic-abiotic features may be found in various living spaces. When multiple areas are present, each has its own thermal characteristics, which influence movement or physiological response. This friendly character influences how people understand population factors. Exercises carried out by individuals as influenced by their life histories, environments, and warm climates (Smith, 2001).

3. Methods

3.1.1. Field Studies

The present evaluation was conducted from 2006 to 2008, including all four seasons. The reptile type was observed and its population's history was examined using various methods and techniques. The main purpose of the Visual Experience Review (VES) was to establish an agenda for the serious review regions (ISA) and to expand a comparable approach on a large scale (state level). Cuts across were used to conduct systematic network inspections at various review locations. These evaluations were completed during the heaviest reptile migration seasons.

3.1.2. Survey of Visual Encounters (VES)

Crump (1971) recommended the use of visual experience study as a common technique to retain a range of reptiles in the selected ISAs. Since many of the species are very elusive and only reveal their existence when startled, VES dynamic brushing operations were completed in every season to record the reptiles. Additionally, the brushing chores assisted in assessing the requirements for distinct species' small dwelling spaces. Reptiles in diverse locations were evaluated, and wide event designs with species agendas with their relative overflow in phrasing were available. The evaluations were conducted at all hours in order to include both daytime and nocturnal species. A thorough search was conducted in every season, and every conceivable territory (small hedges, leaf litter, tree rinds, hutments and dwellings, etc.) that reptiles may hold was checked for their existence. Small stones, fallen logs, and shakes were improved and thoroughly examined for the existence of species. For species that couldn't be identified in the field, the hand-catching approach was used (Blomberg and Sparkle, 1996). They were taken to the lab where their arranged characters were meticulously read. The species ID was completed using common monographs.

4. Result and Discussion

The broad field reads up directed for the time of two years in all the chose ISAs created a quantum of information which was additionally broke down for the different environmental boundaries. Prior to continuing with the biological boundaries it was fundamental to look at whether the inspecting accomplished for all the ISAs was sufficiently adequate to give helpful outcomes. Thusly, a rarefaction examination was performed to really take a look at the quantum of testing and as portrayed in figure 1 species collection bend have arrived at their asymptote for all the chose

ISAs consequently showing adequate inspecting. After ascertainingthe testing size through rarefaction examination, further investigation of other biological boundary was done.

As referenced before the information on ordered gatherings locally' is expected to push forward with the biological examinations. Hence, it was felt compulsory to have a far reaching study through all the chose ISAs for the presence of different scientific categorizations of reptile that they harbor. A sum of 21 saurian species having a place with 8 families were recorded from all the four ISAs. Table 1 presents the rate species lavishness as noticed for all the ISAs. Taking into account such a rich variety of reptiles across the review destinations, there was a desire to look at the variety inside the recorded 8 families and furthermore to find whether every one of the families happened at each study site. Figure 2 uncovered the species wealth inside the families. It was found that two groups of reptiles to be specific Lacertidae and Uromastycidae were restricted elite to ISA-4. It was likewise obviously clear that ISA-4 was the most different of the multitude of networks (for example chosen ISAs) with a limit of 17 animal categories happening in that and subsequently the species wealth being most elevated for ISA-4 (Table1, Figure 1).

Table: 1. Rate Species Lavishness of Lizards in various ISAs

Species	ISA-1	ISA-2	ISA-3	ISA-4
Brachysaura minor	-	-	-	+
Calotes versicolor	+	+	+	+
Sitana ponticeriana	+	+	+	+
Chamaeleo zeylanicus	+	+	+	+
Eublepharis fuscus	-	-	-	+
Cyrtopodion kachhensis	-	-	-	+
Hemidactylus brookii	+	+	+	+
Hemidactylus flaviviridis	+	+	+	+
Hemidactylus leschenaultii	+	+	+	-
Hemidactylus persicus	-	-	-	+
Hemidactylus triedrus	-	-	-	+
Acanthodactylus cantoris	-	-	-	+
Ophisops jerdoni	-	-	-	+
Ophisops microlepis	-	-	-	+
Lygosoma albopunctata	+	-	-	-
Lygosoma punctata	+	+	-	-
Mabuya carinata	+	+	+	+
Mabuya macularia	+	+	+	-
Uromastix hardwickii	-	-	-	+
Varanus bengalensis	+	+	+	+
Varanus griseus	-	-	-	+
Total number of Species	**11**	**10**	**9**	**17**
(%) Species Richness	**52.3**	**47.6**	**42.8**	**80.9**

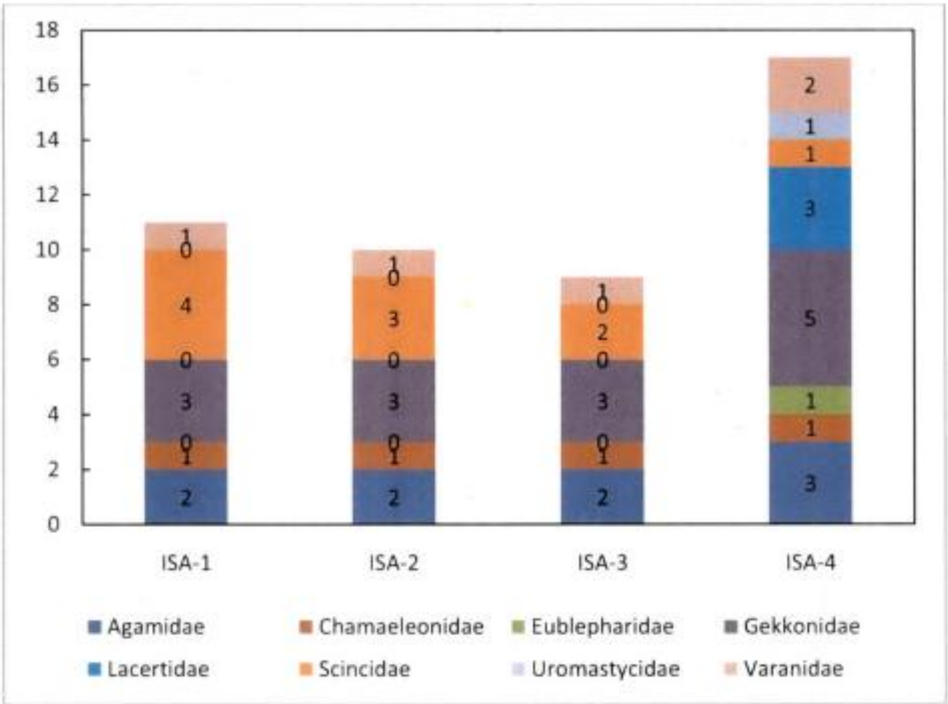

Figure: 1. Family and species sythesis of reptile networks at the chose ISAs

In light of the rate species wealth and the occasional examining in all the review locales, rate event of every one of the reptile animal varieties was worked out. Utilizing these qualities the recurrence of event of every reptile species in the chose not entirely settled. Larger part of the species experienced was exclusively in ISA-4 and was uncommon as against the normal species that were either plentiful or genuinely normal in all the ISAs. Species, for example, Chamaeleozeylanicus however happened in all the ISAs was as yet an uncommon animal types to find. Having known the recurrence of event for every one of the review destinations, the following stage was to explain the living space inclination of every one of the singular animal varieties. To resolve this issue the territory was extensively arranged into five significant heads and the reptiles happening in that were recorded. Table 4 shows the territory use of various reptiles in the chose ISAs. Each environment gave a bunch of microhabitats and these were of prime significance to lesser faunal species as their essential necessities were met inside these microhabitats

5. Conclusion

Reptile, any of the approximately 8,700 species of the class Reptilia, the group of air-breathing vertebrates that have internal fertilization and a scaly body and are cold-blooded. Most species have short legs (or none) and long tails, and most lay eggs. Living reptiles include the scaly reptiles (snakes and lizards; order Squamata), the crocodiles (Crocodylia), the turtles (Testudines), and the unique tuatara (Sphenodontida). Being cold-blooded, reptiles are not found in very cold regions; in regions with cold winters, they usually hibernate. They range in size from geckos that measure about 1 in. (3 cm) long to the python, which grows to 30 ft (9 m); the largest turtle, the marine leatherback, weighs about 1,500 lb (680 kg). Extinct reptiles include the dinosaurs, the pterosaurs, and the dolphinlike ichthyosaurs.

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