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Environmental strategy of survival & perpetuation in garden lizard *Calotes versicolor* Madhepura, Bihar, India

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Abstract: Garden lizard is currently falling in the red list of endangered reptiles. However the species, *Calotes versicolor* is trying to protect its racial survival by adopting several environmental strategies which is purely behavioral & scientific observation on the ethology of the garden lizard with respect to its protection needs to be genetically verified & established. Nevertheless, there is evidence that the *Calotes versicolor,* the lizard, is now established in Madhepura (Bihar), and it is reported to be dispersing away from its original point of introduction. Collected data on its habitats, feeding habits, predators and parasites show that this species is adaptable, prolific and omnivorous, and it is considered to be an invasive alien species that competes with or feeds on native biota in some parts of the Bihar state, such as Purnea and Saharsa. These population need to be studied to prevent their potential ecological threat.

Keywords: Environmental strategies, survival, perpetuation, environmental threat, *Calotes versicolor,* Madhepura

INTRODUCTION

Environmental strategies for survival & perpetuation are one of the most remarkable etho-ecological phenomenons observed by flora & fauna in any eco-system. Large number of species crowdiong in the particular habitats at community level in one hand & some getting spread over wide range of geographical stretch undergo continuous species change & turn over in the population. The lizard, *Calotes versicolor* is a strong candidate for the status of most widespread non-gekkonid lizard in the world. Gunther (1864)[1] noted: "This is one of the most common lizards, extending from Afghanistan over the whole continent of India to China; it is very common in Sri Lanka" Its present distribution stretches from right across southern and south-east Asia to Indo-China to the east, the Maldives, Reunion, Mauritius, including Rodrigues, Seychelles and Florida in the United States.[2-8]

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With growing evidence that *C. versicolor* is an invasive species with potentially harmful ecological impacts in the areas where it is introduced largely because of its omnivorous feeding habits, it is necessary to gather together the available, albeit limited, information on the status of its presence in Madhepura, Bihar, India.[9,10] At the same time the opportunity is taken to review the existing literature on the ecology of the species with a view to summarizing the available data as a basis for further research on its status as a potential threat. It has various common English names used for this species garden lizard, bloodsucker, crested tree lizard etc.

Due to urbanization and increase in human population modification of the natural ecosystem is taking place at alarming rate. As a result of which the flora & fauna are facing great challenges for adaptation bringing alteration in natural habitats, predator communities, predation intensities, composition, distribution as well as availability of food resources.[11,12]

As we know that reptiles are a group of tetrapod, cold-blooded animals that are found almost in entire world, Squamata (lizards) are one of these. These species play a very important role in ecosystem regarding food chain, bio-monitoring pest and also acts as ecological indicator due to their sensitiveness. Even a little change in any of the climatic condition such as temperature, humidity etc may lead to extinction of these species. Therefore serious concern should be taken for the adequate survival of these species.

MATERIALS & METHODS

Collection of the sample

Collection of *C.versicolor* was done from different urban sites of Madhepura district which is situated in the Plains of River Koshi and located in the Northeastern part of Bihar at latitude between 25°.34 to 26°.07' and longitude between 86°.19' to 87°.07' during 2017-2018.[10] Female lizards in early gestation were identified from the different areas and were taken to the Dept of Zoology, B.N.Mandal University Madhepura for its further study. When the eggs reached the stage of 27-28 embryos, they were taken out from the lizard because oviposition occurs usually at 27-28 embryonic stage. The average duration of incubation at 24°C, 27°C, 30°C, and 33°C was 82.1 days, 60.5 days, 51.4 days, and 50.3 days, respectively. Incubation temperature affected hatching success, energy expenditure for embryonic development, and several hatchling traits examined, but it did not affect the sex ratio of hatchlings. Each of the lizards seemed to yield 20±3 eggs. Over all 130 eggs were collected which were then incubated in the laboratory till its hatchling. Altogether 12 individuals were obtained, 7 females and 5 males. As the hatchlings emerged out both the sexes were identified & were separated from each other which were then kept in individual terraria. Growth rate, size of the snout, length of the head was measured periodically (1, 6 & 12 month after the emergence of hatchlings) to study their difference.

Graph 1:Relationship between clutch & egg mss

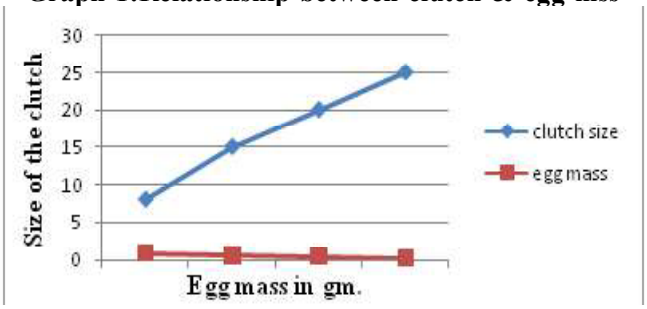

Table no 1:

Months	SVL size		Length of head	
	Male	Female	Male	Female
Hatching	23.52±0.6	24.80±0.7	9.26±0.2	9.50±0.3
First	36.34±0.5	32.02±1.3	11.30±0.3	10.90±0.3
Sixth	71.12±0.8	58.45±1.3	26.5±0.6	20.00±0.6
Twelfth	118.33±2.1	105.20±2.1	39.2±0	30.01±0.8

RESULT AND DISCUSSION

The study related to the survival and perpetuation of garden lizard shows that the mass of egg when compared to clutch size, relationship between both showed the negative correlation i.e. increase in the clutch size lead to decrease in the mass of the egg which has also been reported in the graph 2. While when the SVL size and length of the head was measured in both the male and the female after the hatching, the hatchling of both the sex showed variable differences. The length of the SVL of male & female showed very minute amount of differences, further while calculating the head the female had larger than the males. In first month hatchlings both the sex had rather similar amount of variation in SVL size and head length. In sixth month and twelve month hatchlings although much variation is not found in length of the head however great differences has been found out in the SVL length in both the sexes of the lizards.

Thus the present study reports that temperature, other environmental factors are the major cause for change in the developmental strategy of the garden lizards not only the lizards but also the other reptiles. Since the reptiles are ectothermic, cool temperature usually lowers down the development of the reptiles while warm temperature speeds up the development.

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