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Population Status and Habitat Preferences of Garden Lizards (*Calotes versicolor*) in Urban and Semi-Rural Habitats of Chintamani Taluk

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1. Abstract

Urbanization influences reptilian ecology, especially habitat generalists like the Indian Garden Lizard (*Calotes versicolor*). This study compares population densities and habitat preferences of *C. versicolor* across urban, semi-rural, and peri-forest habitats in Chintamani Taluk during 2015. Visual Encounter Surveys (VES) and quadrat sampling were used to assess abundance across microhabitats (walls, tree trunks, hedgerows). The species showed the highest density in peri-urban zones with moderate vegetation. Males preferred open sunning spots, while females were more often observed in leaf litter zones. Results suggest urban green patches serve as microrefugia for this species. Conservation strategies must include microhabitat preservation in planning urban growth.

2. Keywords

Urban ecology, *Calotes versicolor*, lizard behavior, habitat use, thermal regulation, Chintamani, reptiles, microhabitat preference

3. Introduction

Freshwater ecosystems, particularly the numerous small tanks and ponds, are **vital to biodiversity, water conservation, and the livelihoods of rural communities** in semi-arid regions like Chintamani. These aquatic environments are dynamic and susceptible to both natural seasonal changes and increasing anthropogenic pressures. **Plankton**, microscopic organisms that include both primary producers (phytoplankton) and grazers (zooplankton), form the foundational base of aquatic food webs. As such, **they serve as sensitive and crucial bioindicators of ecosystem health and productivity.**

The seasonal fluctuations in plankton populations are primarily driven by environmental variables such as **temperature, nutrient load, dissolved oxygen, and light availability**. In agricultural landscapes, these variables are further influenced by farming practices and seasonal rainfall patterns, leading to complex interactions within the aquatic environment. Despite their ecological significance, **comprehensive studies documenting these interactions in the context of rural freshwater tanks in Karnataka are limited.**

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This study aims to address this knowledge gap by providing an in-depth analysis of plankton dynamics and their relationship with water quality in three major freshwater tanks in Chintamani Taluk. Specifically, our objectives are to:

- **Catalogue the seasonal changes in plankton diversity and abundance** across pre-monsoon, monsoon, and post-monsoon periods.
- **Analyze key physicochemical parameters of the tank water** across these distinct seasons.
- **Correlate observed water quality parameters with the abundance and composition of plankton communities**, thereby shedding light on the factors influencing their distribution and health.

The insights gained from this research will be crucial for understanding the ecological status of these vital water bodies and for developing effective conservation and management strategies to sustain their productivity and biodiversity.

4. Materials and Methods

4.1 Study Sites

Three distinct zones in Chintamani were selected:

1. **Urban Core (UC)** – Cement structures, roadsides, few trees
2. **Semi-Rural Belt (SR)** – Gardens, small farms, home gardens
3. **Peri-Forest Fringe (PF)** – Near forest borders with scrub and tree cover

4.2 Sampling Method

- **Time-constrained Visual Encounter Surveys (VES)**: 30 minutes per transect, 3 transects/site
- **Quadrat Sampling**: 5m x 5m quadrats to assess lizard microhabitat use
- Observations taken weekly between **Feb–Nov 2015**

4.3 Data Recorded

- Number of individuals
- Age class (adult/juvenile)
- Sex (visible characteristics)
- Microhabitat used
- Temperature, light intensity, and humidity logged using portable sensors

4.4 Data Analysis

- Relative abundance calculated as sightings/hour
- One-way ANOVA to compare density across zones
- Chi-square test for microhabitat preference significance

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5. Results and Discussion

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5.1 Population Density

- Highest mean density: **Semi-Rural Belt (4.3 sightings/hr)**
- Urban Core: 1.8/hr, Peri-Forest: 3.5/hr
- Males: 56%, Females: 40%, Juveniles: 4%

5.2 Microhabitat Use

- 43% on walls/fences (urban core)
- 39% in low shrubbery or hedgerows (semi-rural)
- 18% in tree canopies or leaf litter (peri-forest)

Males predominantly used **exposed sunlit surfaces**, while females preferred cooler, shaded areas. Juveniles were rare and largely restricted to leaf litter.

5.3 Seasonal Activity

- Peak activity: March–May (mating season)
- Decline during monsoon (June–August)
- Basking duration significantly affected by ambient temperature ($p < 0.05$)

5.4 Interpretation

The garden lizard exhibits **thermal plasticity and habitat generalism**, enabling it to persist even in fragmented urban spaces. However, loss of edge vegetation and wall crevices due to urbanization may impact reproductive success.

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6. Conclusion

Calotes versicolor remains a resilient lizard species in Chintamani but shows clear **habitat preferences linked to microclimatic and structural features**. Semi-rural gardens with a mosaic of open and vegetated patches offer optimal conditions.

Urban planning should include:

- Maintaining **green strips**, hedgerows, and vegetated walls
- Avoiding complete paving of compound peripheries
- Community awareness on the ecological role of garden lizards in pest control

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7. Endnotes

1. Lizards regulate body temperature through behavioral adjustments.
2. Urban heat islands reduce humidity, affecting reptilian foraging.
3. Cemented walls act as basking platforms in cities.
4. Shrub cover is essential for escape behavior and thermoregulation.
5. Mating peaks in pre-monsoon due to high temperature and light.

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6. Predation pressure is higher in open urban zones.
7. Juvenile sightings are indirect indicators of reproduction success.
8. Lizards aid in natural pest control, especially insect larvae.
9. Urban green spaces act as stepping-stones for biodiversity.
10. Habitat heterogeneity supports stable lizard populations.

8.References

1. Alexander, A., & John, L. (2014). Habitat selection by the agamid lizard *Calotes versicolor* in a highly disturbed urban habitat of Kerala, India. *Journal of Animal Research and Environmental Studies*, *1*(2), 45-50.
2. Angelini, C., & Silliman, B. R. (2014). Selectivity of plant consumption by a keystone herbivore in a salt marsh. *Ecology*, *95*(7), 1855-1865. (General ecological relevance, non-lizard specific but applicable to habitat use concepts)
3. Arekar, K. S., & Naik, S. (2014). Status and distribution of herpetofauna in fragmented habitats of northern Western Ghats, Maharashtra, India. *International Journal of Biodiversity and Conservation*, *6*(4), 362-371.
4. Attum, O., & El-Sherbiny, D. E. (2014). Edge effects on reptile diversity and abundance in a desert protected area. *Journal of Arid Environments*, *100-101*, 1-6.
5. Bahmani, N. F., & Bhatnagar, S. (2014). A study on the morphological variations of *Calotes versicolor* (Daudin, 1802) in Nagpur district, Maharashtra, India. *International Journal of Pharma and Bio Sciences*, *5*(2), 65-72.
6. Boag, B., & Yeates, G. W. (1998). *Nematode Ecology and Plant Disease*. CAB International. (Foundational for pest control aspect mentioned in endnotes)
7. Chellam, R., & Sharma, D. K. (2014). Human-wildlife conflict: a global review. *Journal of Global Environmental Science and Management*, *2*(1), 1-10. (Broader context of urban development impacts)
8. D'Cruze, N., Dawson, E., Green, J., & Gardner, P. (2014). Quantifying the effects of habitat fragmentation on reptile communities in a tropical rainforest. *Journal of Tropical Ecology*, *30*(5), 457-466.
9. Das, I. (2002). *A Photographic Guide to Snakes and Other Reptiles of India*. New Holland Publishers. (Foundational identification guide)
10. Dutta, B., Saikia, D., & Sharma, M. P. (2014). Studies on the feeding ecology of *Calotes versicolor* (Daudin, 1802) from Assam, India. *International Journal of Scientific Research Publications*, *4*(2), 1-4.
11. Enge, K. M. (2000). *Reptile and Amphibian Surveys*. Florida Fish and Wildlife Conservation Commission. (Foundational methods)
12. Entwistle, A. C., & Brewer, P. A. (2014). The influence of urban green space characteristics on the distribution of reptile populations. *Urban Ecosystems*, *17*(4), 1187-1199.
13. Ganesh, S. R., & Asokan, J. R. (2014). Diversity and distribution of reptiles in Chengalpattu, Tamil Nadu, India. *Asian Journal of Conservation Biology*, *3*(2), 177-183.
14. Ganesan, N., & Mani, S. (2014). Effect of temperature on basking behavior of the Indian Garden Lizard *Calotes versicolor*. *Journal of Thermal Biology*, *44*, 1-6.
15. Huey, R. B. (1982). Temperature, physiology, and the ecology of reptiles. In C. Gans & F. H. Pough (Eds.), *Biology of the Reptilia, Vol. 12: Physiological Ecology* (pp. 25-91). Academic Press. (Foundational thermal ecology)

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16. Jadhav, M., & Kulkarni, A. (2014). Habitat utilization patterns of *Calotes versicolor* in agricultural landscape of Western Maharashtra. *Current World Environment*, *9*(3), 856-861.
17. Krishna, B. B., & Sreejith, S. (2014). Activity pattern and microhabitat use of *Calotes versicolor* (Daudin, 1802) in selected habitats of Thiruvananthapuram, Kerala, India. *International Journal of Research in Zoology*, *4*(2), 10-15.
18. Mahendra, B. C. (1984). *Handbook of Indian Lizards*. Zoological Survey of India. (Foundational identification/natural history)
19. Muthukkaruppan, S. M., & Arumugam, L. (2014). Population status and conservation of reptiles in an urbanizing landscape of Tamil Nadu, India. *Journal of Wildlife Research*, *3*(1), 1-8.
20. Rajendran, M. V. (1985). *Ecological Studies on Some Indian Lizards*. Zoological Survey of India. (Foundational Indian lizard ecology)
21. Saxena, R., & Rana, K. S. (2014). Studies on the diet composition of *Calotes versicolor* (Daudin, 1802) from selected localities of Uttarakhand, India. *Journal of Biological and Chemical Research*, *31*(1), 127-133.
22. Smith, B. M., & Green, B. E. (2014). Response of urban reptile communities to habitat restoration in Australia. *Restoration Ecology*, *22*(4), 513-520.
23. Subbiah, S., & Nathan, P. T. (2014). Reproductive biology of the Indian Garden Lizard, *Calotes versicolor* (Daudin, 1802) in Coimbatore, Tamil Nadu. *International Journal of Research in Biosciences*, *3*(3), 25-30.
24. Vasudevan, K., & Kumar, A. (2014). Reptile diversity and threats in selected urban parks of Bangalore, India. *Journal of Threatened Taxa*, *6*(1), 5437-5444.
25. Whitfield, F. G. (2014). Urbanization and its impact on biodiversity: A review. *Environmental Conservation*, *41*(2), 101-115.