

VOLUME 11 ISSUE 1 2025

ISSN 2454 – 3055



**INTERNATIONAL
JOURNAL OF
ZOOLOGICAL
INVESTIGATIONS**

***Forum for Biological and
Environmental Sciences***

Published by Saran Publications, India



International Journal of Zoological Investigations

Contents available at Journals Home Page: www.ijzi.net

Editor-in-Chief: Prof. Ajai Kumar Srivastav

Published by: Saran Publications, Gorakhpur, India



ISSN: 2454-3055

Unstructured Observation of Oriental Rat Snake (*Ptyas mucosa*) Raiding on Streak-throated Swallow (*Petrochelidon fluvicola*) Nest Colony

Dhande Abhishek, Chude Meghraj* and Bagul Jagdish

Department of Zoology, B.P. Arts, S.M.A. Science and K.K.C. Commerce College, Chalisgaon Dist. Jalgaon 424101, Maharashtra, India

**Corresponding Author*

Received: 17th September, 2024; **Accepted:** 22nd December, 2024; **Published online:** 26th March, 2025

<https://doi.org/10.33745/ijzi.2025.v11i01.049>

Abstract: This study's incident case study is based on unstructured observations of the common oriental rat snake, *Ptyas mucosa*, raiding Streak-Throated Swallow (*Petrochelidon fluvicola*) nests in the Chalisgaon region of District Jalgaon in the summer of 2023, in order to engage in predatory behaviour. This article aims to shed light on an uncommon and infrequently described ecological interaction based on observations made in a naturalistic environment. The diet of the Oriental rat snake is varied; it feeds on a variety of animals such as fish, frogs, arthropods, rodents, birds. The intricate relationships between snakes and their avian prey are highlighted by the fact that it has also been seen attacking the nests of Streak-throated Swallows, whose mobbing behavior has been noted as a defense mechanism against predation. A fascinating feature of the predator-prey relationship in the wild is revealed by the unstructured nature of the observations, which is the highlight of the study.

Keywords: Oriental rat snake, *Ptyas mucosa*, Streak-throated Swallow, *Petrochelidon fluvicola*, Prey-predator

Citation: Dhande Abhishek, Chude Meghraj and Bagul Jagdish: Unstructured observation of oriental rat snake (*Ptyas mucosa*) raiding on streak-throated swallow (*Petrochelidon fluvicola*) nest colony. Intern. J. Zool. Invest. 11(1): 466-472, 2025.

<https://doi.org/10.33745/ijzi.2025.v11i01.049>



This is an Open Access Article licensed under a Creative Commons License: Attribution 4.0 International (CC-BY). It allows unrestricted use of articles in any medium, reproduction and distribution by providing adequate credit to the author (s) and the source of publication.

Introduction

The streak-throated swallow, also known as the Indian cliff swallow (*Petrochelidon fluvicola*), belongs to the passerine bird family, comprising numerous species, among them a variety of swallows. Cliff Swallows construct distinctive mud nests that have attracted ornithologists and behavioural biologists worldwide (Chaya and Channaveerappa, 2012). The nest-building

behaviour of these birds is contingent upon favourable environmental conditions, notably the quality of mud substrate, proximity to water sources, availability of suitable food resources, and mitigation of predation and parasitic threats (Kilgore and Knudsen, 1977). Brown *et al.* (2000) studied the different factors affecting the reproductive success of the cliff swallow, sites

reused in consecutive years with the highest success rates in one season exhibited the most significant colony growth in the following season, attracting the highest influx of immigrants. According to the study of Imlay *et al.* (2019), nestling mass and temperature have a negative relationship, with greater mass during colder months.

Ptyas mucosa (Linnaeus, 1758) commonly called as oriental rat snake/Indian rat snake. *P. mucosa* prefers locations next to residential areas in the wild (Boeadi *et al.*, 1998). It is diurnal snake that lives in open areas, such as agricultural systems; it mostly eats rodents and amphibians for food. Based on Whitaker and Captain (2004), Parmar and Tank (2019), the Indian Biodiversity Portal (2023), and other reports, the Indian rat snake is a common, widespread, non-venomous snake found throughout India in various habitats such as xeric regions, coastal lines, mesic habitats, open fields, deciduous forests, scrub jungles, evergreen forests, and agricultural lands. The majority of snakes are carnivorous, with different species taking a range of invertebrate and vertebrate prey, usually in proportion to the size of the predator and the prey (Greene, 1997). Additionally, scavenging has been documented in a variety of snake species (DeVault and Krochmal, 2002). *Hoplobatrachus tigerinus*, *Eutropis dissimilis*, *Euphlyctis cyanophlyctis*, *Fejervarya limnocharis*, and unidentified toads are among the prey items of *P. mucosa* that have been documented in the literature (Wall 1926; Dunn 1935; Minton 1966; Sharma and Vazirani 1977; Whitaker and Captain 2004). Moreover, research has revealed that *P. mucosa* exhibits peculiar feeding and scavenging habits, such as ingesting plastics, onions, male contraceptives, textile scraps, abandoned socks, and polythene rolls, as documented by Sharma *et al.* (2016), Saha and Chaudhuri (2017), Chowdhury (2018), and Parmar and Patel (2022). Snake stomach content analyses usually provide information about the ecosystem's diet, but *P. mucosa* individual's reflux reveals a broad range of food preferences, which may help maintain metabolic energy through

active foraging (Kirubakaran *et al.*, 2023). Predators may opportunistically forage, depending on whatever prey is available, as a result of their need to consume food to avoid food shortages; this strategy may seem expensive, yet it is effective for generalist predators (Westoby, 1978; Pereira *et al.*, 2016). The study of interaction between prey and predator is crucial in understanding the trophic ecology of a given habitat (Dorresteijn *et al.*, 2015).

After a thorough review of the literature, no previous reports of Oriental rat snakes (*Ptyas mucosa*) predating on colonies of Streak-throated Swallows (*Petrochelidon fluvicola*) have been found. This implies that this is an unusual observation that has to be investigated further and reported to the scientific community. This report provides a detailed account of unstructured observations detailing Oriental rat snakes (*Ptyas mucosa*) raiding Streak-throated Swallow (*Petrochelidon fluvicola*) nest colonies.

Materials and Methods

Study area

The study was done in the Chalisgaon region of Jalgaon district, Maharashtra, India (Figs. 1, 2). The main study region was Chalisgaon Taluka, which was selected due to the abundance of Streak-throated Swallow (*Petrochelidon fluvicola*) nesting colonies and its varied bird population. The study site's geographic coordinates are latitude 20.485865239295997 and longitude 74.99588958778943.

The study was done on the basis of unstructured observation and recorded cases of Oriental rat snakes (*Ptyas mucosa*) attacking colonies of streak-throated swallows. With this method, predator-prey interactions might be observed in a naturalistic manner without disturbing behaviour. During the day time, active nest colonies on cliff close to water bodies were the subject of observation sessions.

Recording Equipment

A Canon Power Shot SX50 HS camera with high-

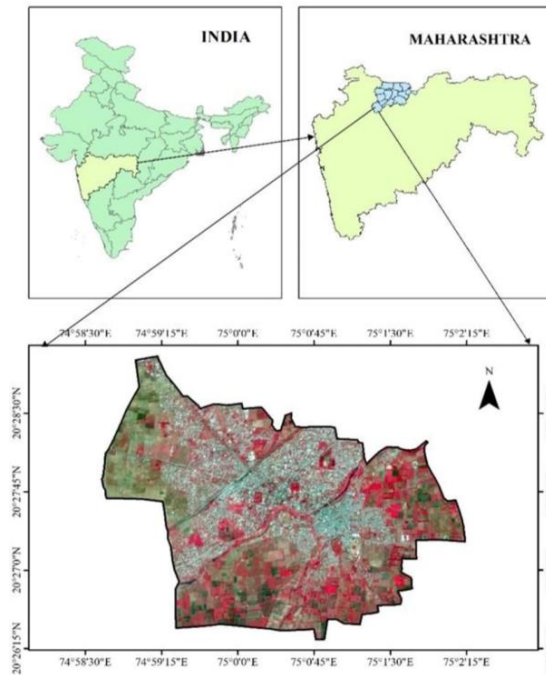


Fig. 1: Study area: Country India, State Maharashtra, Region Chalisgaon Dist. Jalgaon. (Patil *et al.*, 2022).



Fig. 2: Study area: Site A- Nesting Site of *Petrochelidon fluvicola*; Site B- Point of observation (Source: Google map).

definition video recording capabilities was used to record the observations. The observation and recording was done without interfering with the animals' normal behaviour from around 50 meter away from the nesting site.

Results and Discussion

Observation 1: On March 30th 2023 at 7:15 a.m. during the regular observation of nests of streak throats swallow the swallows were mobbing and

flying in circular formations, suddenly a snake fell from the nest colony into the water and swam away while swallows pursued its mobbing for some distance. The Identity of the snake could not be made and no video or photo taken but only with mobile phone.

Observation 2: On the morning of 30th May 2023 a snake was observed raiding the nests of Streak-throated Swallows, *Petrochelidon fluvicola* (Fig. 3).



Fig. 3: Oriental rat snake (*Ptyas mucosa*) raiding on Streak-throated Swallow (*Petrochelidon fluvicola*) nest colony.

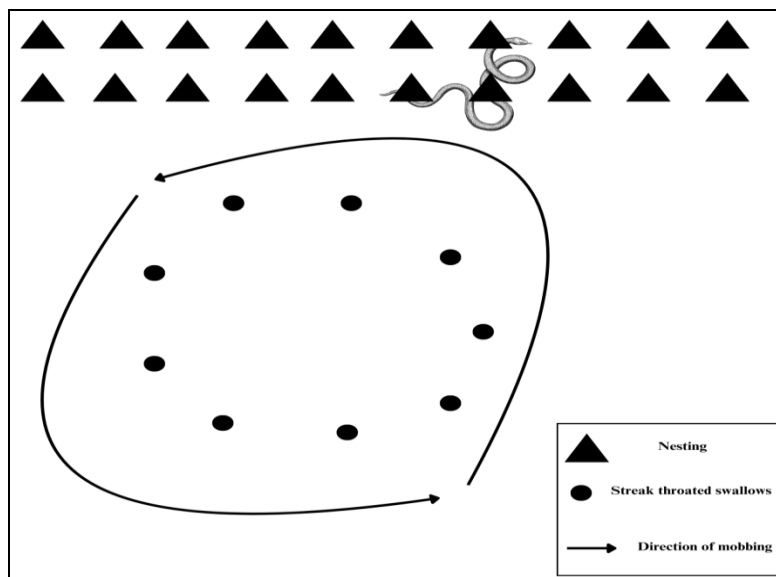


Fig. 4: Illustration of Predator-Driven Mobbing: Streak-Throated Swallows' response.



Fig. 5: Mobbing behaviour of Streak-throated swallows in response to a snake raid.

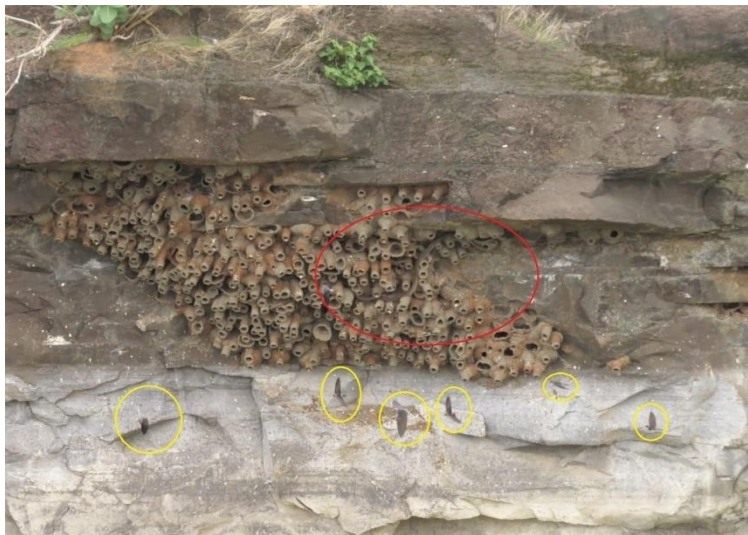


Fig. 6: Predator-Driven Mobbing: Streak-Throated Swallows Response (Oriental Rat Snake in red circle; Streak-Throated Swallows in yellow circles).

The snake was later identified as Oriental rat snake; periodically searched the entire nest for preying upon eggs or chicks; whether its purpose was accomplished or not remains a mystery as due to the long distance of 50 m between the point of observation and the nest colony, the view was obscure.

This nest colony of streak throated swallows is located at Kargaon Tanda village area, behind Kargaon Ganpati temple located in Chalisgaon region. The nests are constructed on the cliffs formed due to excavation of rocks and gravel from ground and these mines are filled with rainwater forming lakes. The cliffs of these gravel mines are vertical and around 3 to 4 m in height from water level and on these cliffs Streak-throated Swallows have constructed their mud nests around 350 in numbers.

The observation was started at 9 a.m. till 11 a.m. The snake was observed raiding for around two hours after that the authors had to leave the place due to some obligations leaving the scene of action; the snake was observed for around 2 h during which the swallows tried three times mobbing and flying in circles. The circular mobbing flights by the swallows failed to dislodge the snake from the nest colony (Fig. 4). During the circular flights the birds (Streak-throated Swallows) from another nests colony which was

located around 100 m away on the walls of government grain warehouse also join in.

Oriental rat snake feeds chiefly on various types of animals including frogs, fishes arthropods and rodents and birds (Whitakar and Captain, 2008). It is also known for capturing *Pteropus giganteus* (Daniel, 2002; Mallick *et al.*, 2022).

It is also known to raid Streak-throated Swallow (*Petrochelidon fluvicola*) nest (Tere *et al.*, 2023), but in the last case the nest were found 1 meter above the water level and under the bridge where the predator evading circular flights by the swallows were not possible, whereas in the given case the cliff height is around 3 meters and in open space. During second observation the mobbing flight has occurred three times and; as observed in first observation it has resulted in evasion of predator (Figs. 5, 6). The main goal of mobbing is to drive away a possible predator by having potential prey approach it and irritate or even attack it (Curio, 1978; Caro, 2005). Mobbing on a predator may also reduce the possibility of attacks in the future (Flasskamp, 1994). However, because predators may kill a prey while mobbing, it can also be expensive (Sordahl, 1990; Motta-Junior, 2007). During our observation, no harm to the swallows has occurred during the mobbing activity.

Few snake species have been observed ingesting bird eggs, despite the fact that several species are known to swallow nestling birds, chicks, and adults that are caring for their young. Snake predation of eggs can affect the dynamics of bird populations and decrease bird recruitment (Lavers *et al.*, 2010). Because they eat so many bird eggs, snakes may have an indirect impact on biological communities ecosystems function (Barends and Maritz, 2022). Understanding which snakes eat bird eggs is an essential first step towards understanding these dynamics. Researchers can create predator-specific hypotheses for a variety of habitats and situations by knowing which snake species eat eggs.

Ethical Statement

This is an observational study. Therefore no ethical approval is required.

Author Contributions

Each author equally shared in the field observation, writing, editing, conducting thorough analysis, drafting the manuscript, and preparation of illustrations. All authors have read and agreed to the published version of the manuscript.

Acknowledgements

Authors extend our sincere gratitude to Dr. A.B. Sawarkar, Head of the Department of Zoology at B.P. Arts, S.M.A. Science, and K.K.C. Commerce College, Chalisgaon, for his invaluable expertise in species identification. We are deeply thankful to our college Principal for their constant motivation. Special appreciation goes to Dr. Jamatsingh Rajput for his meticulous assistance in structuring and writing this research paper. The Research Academy of our college provided essential resources, and we are grateful.

Conflict of Interest

The authors declare no conflicts of interest.

References

Barends JM and Maritz B. (2022) Snake predators of bird eggs: a review and bibliography. *J Field Ornithol.* 93(2): 1.

- Boeadi S, Shine R, Sugardjito MA and Sinaga MH. (1998) Biology of the commercially harvested rat snake (*Ptyas mucosus*) and cobra (*Naja sputatrix*) in Central Java. *Mertensiella* 9: 99-104.
- Brown CR, Brown MB and Danchin E. (2000) Breeding habitat selection in cliff swallows: the effect of conspecific reproductive success on colony choice. *J Anim Ecol.* 69(1): 133-142.
- Caro TM. (2005) Antipredator defenses in birds and mammals. University of Chicago Press. <https://press.uchicago.edu/ucp/books/book/chicago/A/bo3534710.html>
- Chaya HC and Channaveerappa H. (2012) Effect of red ant invasion on the nesting and brood of Indian cliff swallows. *Int J Adv Pharm Biol Chem.* 1: 472-476.
- Chowdhury S. (2018) *Ptyas mucosa* (Indian Rat snake). Diet and behavior. *Herpetol Rev.* 49: 352-353.
- Curio E. (1978) The adaptive significance of avian mobbing. *Zeitschrift Für Tierpsychologie* 48(2): 1750-183.
- Daniel JC. (2002) The Book of Indian Reptiles and Amphibians. Bombay Natural History Society, Mumbai, pp. 248.
- DeVault TL and Krochmal AR. (2002) Scavenging by snakes: an examination of the literature. *Herpetologica* 58(4): 429-436.
- Dorresteijn I, Schultner J, Nimmo DG, Fischer J, Hanspach J, Kuemmerle T, Kehoe L and Ritchie EG. (2015) Incorporating anthropogenic effects into trophic ecology: predator-prey interactions in a human-dominated landscape. *Proc Royal Soc B Biol Sci.* 282(1814): 20151602.
- Dunn ER. (1935) The reptiles of China: Natural History of Central Asia. <https://doi.org/10.1126/science.82.2126.303>
- Flasskamp A. (1994) The adaptive significance of avian mobbing. V. An experimental test of the 'Move On' Hypothesis. *Ethology* 96(4): 322-333.
- Greene HW. (1997) Snakes: the evolution of mystery in nature. Univ California Press, pp. 351.
- Imlay TL, Nickerson D and Horn AG. (2019) Temperature and breeding success for Cliff Swallows (*Petrochelidon pyrrhonota*) nesting on man-made structures: ecological traps? *Canadian J Zool.* 97(5): 429-435.
- India Biodiversity Portal (2023) *Ptyas mucosa*. <https://indiabiodiversity.org/species/show/257422>
- Kilgore Jr DL and Knudsen KL. (1977) Analysis of materials in cliff and barn swallow nests: relationship between mud selection and nest architecture. *The Wilson Bull.* 80(4): 562-571.

- Kirubakaran S, Anbazhagan A, Vishnu CS and Sagadevan R. (2023) A regurgitation event in Indian Rat snake *Ptyas mucosa* (Linnaeus, 1758) provides insights into its diet. *Hamadryad* 40(1&2): 59-62.
- Lavers JL, Wilcox C and Josh Donlan C. (2010) Bird demographic responses to predator removal programs. *Biol Invasions* 12: 3839-3859.
- Mallick S, Ghosh G and Raut SK. (2022) Bat predation by Rat-snake *Ptyas mucosa*. *Indian Forester* 148(9): 1073-1074.
- Minton SA. (1966) A contribution to the herpetology of West Pakistan. *Bull American Museum Natural History* 134: 2.
- Motta-Junior JC. (2007) Ferruginous Pygmy-owl (*Glaucidium brasilianum*) predation on a mobbing Fork-tailed Flycatcher (*Tyrannus savana*) in south-east Brazil. *Biota Neotropica* 7: 321-324.
- Parmar D and Patel VD. (2022) Plastic ingestion by the Indian snakes *Ptyas mucosa* and *Coelognathus Helena helena* (Serpentes: Colubridae). *Phyllomedusa J Herpetol*. 21(1): 91-94.
- Parmar D and Tank S. (2019) Herpetofauna of Veer Narmad South Gujarat University, Surat, India. *Reptiles Amphibians* 26(1): 2134.
- Patil N, Patil S., Patil B, Patil V, Suryawanshi A and Jadhav K. (2022) Analysis of urban growth and its impact on agriculture land around the Chalisgaon City in Jalgaon district of Maharashtra, India: A remote sensing and GIS based approach. *J Geomatics* 16(2): 213-224.
- Pereira SC, Rodrigues JFM and Borges-Nojosa DM. (2016) Single large or several small?: The influence of prey size on feeding performance of *Phibdryas nattereri* (Squamata: Serpentes). *Acta Scientiarum Biol Sci*. 38(1): 25-28.
- Saha A and Chaudhuri A. (2017) *Ptyas mucosa* (Indian Rat Snake). Diet/cannibalism. *Herpetol Rev*. 48(3): 681.
- Sharma RC and Vazirani TG. (1977) Food and feeding habits of some reptiles of Rajasthan. *Records Zoological Survey India* 73(1-4): 77-93.
- Sharma V, Sayyed A and Bhandari R. (2016) Herbivory and inanimate objects in the diet of the Oriental Rat snake, *Ptyas mucosa* (Linnaeus 1758). *Reptiles Amphibians* 23(2): 102-103.
- Sordahl TA. (1990) the risks of avian mobbing and distraction behavior: An anecdotal review. *The Wilson Bull*. 102(2): 349-352.
- Wall F. (1926) Snakes collected in Burma in 1925. *J Bombay Natural History Soc*. 31(3): 558-566.
- Tere A, Dhamecha A and Vyas R. (2023) Predation pressure of Oriental Rat Snake *Ptyas mucosa* causing nesting adaptation in Streak-throated Swallows *Petrochelidon fluvicola*. *FLAMINGO Gujarat* VI: 9-11.
- Westoby M. (1978). What are the biological bases of varied diets? *American Naturalist* 112(985): 627-631.
- Whitaker R and Captain A. (2004) *Snakes of India*. MacMillan India Limited, New Delhi, pp.124.