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A Comprehensive Study on the Breeding Success of Indian Spot Billed Duck (*Anas poecilorhyncha*) at Yeldari dam, (MS) India.

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Abstract:

*The local migratory Spot-billed Duck (Anas poecilorhyncha) is found throughout the Indian subcontinent's freshwater habitat. This study examines the breeding biology of the Spot-billed Duck, with special attention to factors affecting breeding performance, nest site selection, and reproductive success. Field observations were made in a variety of freshwater habitats to record hatchling survival rates, clutch size, and nesting activities. The research study shows that Spot-billed Duck good will nesting locations with a lot of foliage because it hides them from potential predators. The breeding success rate is **41.66%**. Reproductive success was shown to be seriously threatened by habitat decline and predation. This research study advances our knowledge of the avian breeding success rate and stresses how crucial freshwater ecosystem conservation is to preserving biodiversity.*

Keywords: Indian spot billed duck, Breeding success, Utipurna, Yeldari dam, Duckling, Clutch size.

Introduction:

The Indian Spot-billed Duck (*Anas poecilorhyncha*) is local migratory one of the most common waterfowl species in India. This species has become known for its ability to adapt to a variety of aquatic environments and spotted at freshwater marshes, irrigation tanks, pools with extensive vegetation. It is protected under the Indian Wildlife (Protection) Act, 1972. This species having a distinctive look, including a distinctive spot on its bill. Because of its vast wetland ecosystem and abundant biodiversity. (V, 2015) The Yeldari Dam is second last large dam, about 101.540 km2 (39.205sq mi) in Marathwada region Maharashtra, India, Initially, the Yeldari Dam was supplied by runoff from the encompassing ranges. (Andhale, 2010)

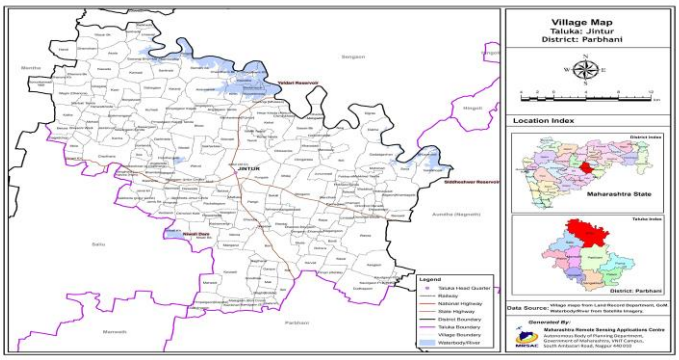
In any case, it presently gets sewage and household squander from different towns and ranches situated around it. The flora of the region is predominantly composed of aquatic plants, which are plant species specially adapted to thrive in areas with high water levels. These aquatic plants play a crucial role in maintaining the ecological balance of the wetland ecosystem by providing habitat and food for various wildlife species. This move has influenced the water quality and poses potential biological challenges for the reservoir and its subordinate natural life., this is dam has been remodelled and created into a huge store, which serves as a major visitor fascination in Parbhani. The transformation has not only enhanced its capacity for water storage and management but also turned it into a scenic spot that

draws visitors for its natural excellence and recreational opportunities. it is important to understand the Indian Spot-billed Duck breeding success at Yeldari Dam for a various reason. First of all, it sheds light on the population dynamics and reproductive health of this species in the study area. Second, it emphasizes how important the freshwater of Yeldari Dam is ecologically for maintaining bird diversity. Lastly, it facilitates the creation of effective conservation plans to protect and sustain duck populations in the face of environmental changes and anthropogenic pressures. Despite being regarded as residents, there aren't many breeding reports of Spot-billed Ducks from Tamil Nadu. The nesting of this species in the state is not specifically described in any of the older literature. It is important to understand and explain the reproductive biology of the Indian Spot Billed Duck on the Yeldari Dam to the public, and accordingly to create awareness among the public about the bird and its conservation, for this, to create awareness about the reproductive and population components of the spot billed duck species. Secondly, it supports avian population dynamics. At least, it helps in the improvement of successful preservation procedures to ensure and support duck populaces in the confront of natural changes and anthropogenic pressures. This considers points to explore the breeding biology of the Indian Spot-billed Duck at Yeldari Dam, centering on key viewpoints such as settle location choice, clutch measure, bring forth success, and components influencing breeding performance. the aim of the study is to shed light on the wetland biological centre of Yeldari Dam and to understand the parameters of this research by reporting on the bird survey. The regenerative biology study seeks to contribute to the wider community and to advise conservation efforts. There are very few records of Spot billed Ducks at Yeldari Dam. Regarding reproduction, the spot billed Duck is considered a resident species. It is hoped this bird will nest in different places in the region and we will gather more information about their reproductive efficiency. In order to find breeding data from Tamil Nadu, especially from the area around Chennai, a thorough search of the other literature already in existence was conducted. Although Dewar (1905) lists this bird in Madras (Chennai), he says nothing about its status or breeding habits. Although Santharam (pers. comm., verbal, undated) cites its alleged nesting in the Padappai area based on his chats with the late E. R. C. Davidar (1922–2010), he never observed any indications of its breeding in the city or its vicinity between 1978–1998. But since 2006, a few nesting reports from Chennai have surfaced, Rahmani & Islam (2008) cite several historical nesting records from the Palni Hills' Kodaikanal and Berijam Lakes elsewhere in the state. According to Vasanthan & Srivatsava (undated), the Spot-billed Duck has been seen in and is considered to be a resident of the Mudumalai Tiger Reserve and Udhagamandalam (Ooty) in the Nilgiris. However, they do not offer any additional information regarding the nesting. According to a recent report, it breeds about 200 kilometers south of Chennai in Thiruvannamalai (Anonymous 2011), which includes a picture of an adult with ten ducklings. Less than 100 kilometers north of Chennai, on Sriharikota Island in the Nellore District of Andhra Pradesh, breeding has also been documented (Sivakumar & Manakadan 2005; Kannan et al. 2009).

Materials and Methods:

1.Study Site

The research is conducted at Yeldari Dam, at the Utipurna as per the location of GPS Map Camera, Yeldari Dam is large perennial water body located in Parbhani district, Maharashtra. Geographic Coordinates of Latitude: 19.2896° N Longitude: 76.3317° E. The average annual rainfall values of Yeldari Dam following are 2018: Annual rainfall: 744 mm. Maximum monthly rainfall: 291 mm (August), Minimum monthly rainfall: 38 mm (September), 2019: Annual rainfall: 971 mm, Maximum monthly rainfall: 374 mm (September), Minimum monthly rainfall: 102 mm (August). (Maroti Govindrao Shirale*, 2022), 2020: Annual rainfall: 485 mm (June) (India, 2020) The average rainfall in the region of Yeldari dam is 788 mm, The rainfall corded in the past few years at Yeldari reservoir is as fallow: 926 mm in 2016, 735mm in 2017, 744mm in 2018, 971mm in 2019. The dam is surrounded by agricultural fields and human habitations, providing a diverse habitat for various bird species.



(Center, n.d.)

2. Field Visit: Field visits were conducted across selected site is Uti Purna, Yeldari dam to observe the breeding success of Indian Spot Billed Duck.

3. Electronical tools: Canon Camera, GPS Mobile Camera, Digital Note pad.

4. Monitoring methods:

a. Point Counts: Researchers conduct point counts at specific locations within the wetland, recording all bird species seen or heard within a certain radius over a set period. This method is widely used due to its simplicity and effectiveness. (Xian Chen 1ORCID, 2023)

b. Transect Surveys: Observers walk along fixed routes (transects) and record birds detected within a certain distance on either side. This method helps cover larger areas and provides data on bird distribution and abundance. (Guidelines, n.d.)

5. **Review of literature**

The Indian Spot-billed Duck (*Anas poecilorhyncha*) is an important waterfowl species of the Indian subcontinent, and Yeldari Dam in Maharashtra provides a semi-natural wetland habitat that supports its breeding and feeding activities. The dam's shallow waters, reed beds, and vegetated margins create suitable nesting grounds, while aquatic plants, seeds, mollusks, and small invertebrates serve as primary food resources. However, the ducks face several ecological challenges. Human disturbances such as fishing, boating, and agriculture near nesting sites, along with fluctuating water levels, often reduce breeding success. Predation by crows, snakes, and other animal, climate change and further contributes to nest losses. Field observations from Yeldari Dam indicate that the overall breeding success rate is moderate, around 41–42%, reflecting the proportion of hatched eggs to total eggs. This relatively low success rate highlights the insecurity of the species in disturbed habitats. Conservation measures such as protecting wetland vegetation, regulating dam water levels during the breeding season, and reducing anthropogenic pressures are essential to sustain populations. Long-term monitoring of breeding success and habitat quality will provide valuable insights for future management strategies. (Mayfield, 1961) This study will contribute significantly to balancing and sustaining the wetland ecosystem.

Results and Discussion:

The breeding success of Indian Spot-billed Ducks was closely observed at Yeldari Dam. The study period extended from October 10, 2023, to December 8, 2023. The eggs were observed to hatch on October 25, 2023.

$$\text{Egg Success} = \frac{\text{Number of eggs hatched}}{\text{Total eggs laid}} \times 100$$

Sr. No.	No. of Nest	No. of Eggs	Hatched Eggs	Unhatched Eggs	Egg Success
1.	1	9	6	3	66.66
2.	1	6	1	5	16.66
3.	1	5	2	3	40
4.	1	4	1	3	25

Total Eggs = 9 + 6 + 5 + 4 = **24**
Total Hatched Eggs = 6 + 1 + 2 + 1 = **10**
Breeding Success Rate $= \frac{10}{24} \times 100 = 41.66\%$
The breeding success rate for the given data is **41.66%**.

In this research study area, the breeding season of Indian Spot-billed Ducks (*Anas poecilorhyncha*) occurs from October 2023 to December 2023. We observed the breeding success of Indian Spot-billed Ducks at Utipurna, Yeldari Dam. The nests were built near water and concealed in vegetation and their own feathers. Indian Spot-billed Ducks laid nine eggs in October, which required approximately 25 days to hatch. After hatching, the young ones are independent and do not rely on their parents for feeding. They immediately enter the aquatic ecosystem to find food on their own. The feeding patterns of young ducklings Indian Spot-billed Ducks (*Anas poecilorhyncha*) primarily involve dabbling for food in shallow waters. They feed on a variety of vegetation, grasses, and small aquatic invertebrates. The ducklings are often seen following their parents closely, learning to forage and feed on similar food items. (Faheem, n.d.)

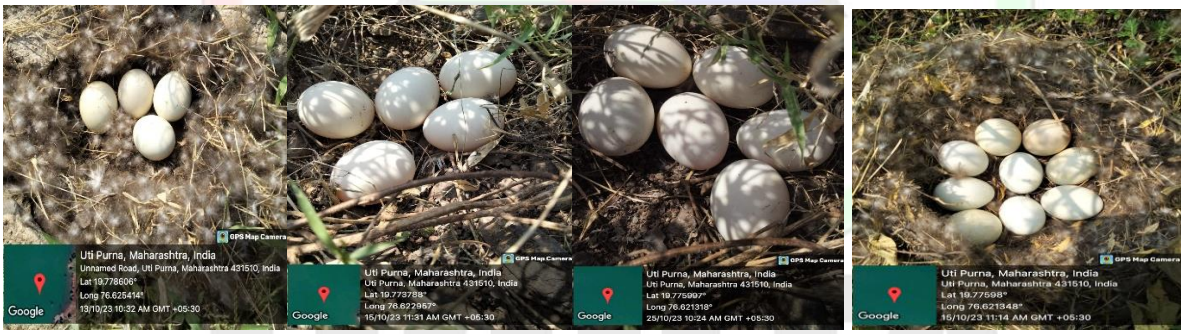


Fig. 1. Nest with Eggs of Indian spot billed duck

Fig. 2. Indian Spot-billed Ducks (*Anas poecilorhyncha*) with ducklings

From the total clutch size, some eggs remained unhatched while the rest successfully hatched. Ducklings leave the nest site and follow their parents to ensure their survival.

Conclusion:

This consider pointed to explore the breeding victory of Indian spot-billed ducks (*Anas poecilorhyncha)* at Yeldari Dam, Maharashtra, India. The information collected over the breeding season uncovered a critical relationship between water levels and settling victory. Our findings indicate that the Spot-billed Duck prefers nesting sites with dense foliage, which offer protection from predators and contribute the hatching success rate **41.66%.** However, habitat degradation and predation pose significant threats to their reproductive success. Middle water levels were found to upgrade the accessibility of settling locales and nourishment assets, which in turn moved forward the large breeding success rate. These discoveries propose that keeping up ideal water levels at Yeldari Dam is vital for supporting the breeding population of Indian spot-billed ducks. These findings underscore the importance of conserving freshwater ecosystems to ensure the survival and biodiversity of avian species. Continued efforts in habitat preservation and predator management are crucial for enhancing the breeding success and long-term viability of the Spot-billed Duck population.

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