

NESTING BEHAVIOR OF CATTLE EGRET (*Bubulcus ibis*).

In southern Punjab (India) during breeding season of 2022 & 2023

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Abstract- Cattle egret (*Bubulcus ibis*) is distributed worldwide & and in India, it is common in many places and seen in a wide range of varieties in different habitats. Nesting sites selected by Cattle egrets considered to be protective, stable, and material that is useful for constructing nests and sites for nesting are selected which is nearby their feeding areas for easy foraging. The nests were having facile platforms, and almost >80% of nests were found on *Acacia nilotica*. When observations made regarding habit and habitats of cattle egret it was found that they do all their works themselves and considered as self-serving, self-centered feeders and their foraging activity recorded and found that they roam around grazing cattle to pick up the insects disturbed by these cattle while roaming in the field and also parasites of large herbivores. It was observed that in the city of Bathinda, Punjab construction of bridges and National highways took place in the lockdown period due to which change in climates observed on a large basis and their habitat has been disturbed to a great extent. In these areas they were observed nesting only on the tree *Acacia nilotica* and if the tree has been cut due to construction or any other reason they don't nest on any other tree. Mostly due to human interference and change in environmental conditions, these are being forced away from their natural habitats. They were found fully adapted to crowded area for nesting and also for their food. They have started following castles and tractors and other agricultural machines and waiting for insects and other prey items that started coming out during agricultural practices. They also learned to fly towards smoky areas and other such activities from a distances to catch as many insects as they can for their food trying to escape from the situation so they can feed on them. They also play the role of a scavenger by eating the flesh of dead mammals at sites carcasses, along with dogs and crows. As we all know vultures have disappeared and after their disappearance, *Bubulcus ibis* start being a scavengers, while earlier these birds were used to reach last at such places.

Keywords: *Bubulcus ibis*, *Acacia nilotica*, Scavengers.

1. Introduction:

Bubulcus ibis (cattle egret) is a global (range of a taxon that extends across all or most of the world in appropriate habitats) species of heron (family, Ardeidae) found in tropics, subtropics and warm temperate zones. These birds are regarded as an excellent indicator of environmental health it has undergone the most rapid and wide-reaching natural expansion. In India it is very common in different varieties of habitats like wetlands, terrestrial, freshwater fields, ponds, marshes, paddy fields, roadside, around cattle, parks, sports lawns means at many places. These birds adapt to both terrestrial and aquatic habitats and are not completely dependent on aquatic habitats to survive but make lots of use of it. These birds are also found to be well adapted to different weathers and ecosystems to survive. Their quality of being adaptive to different ecosystems is the main reason behind their increasing population and survival. Because of their behavior of moving in groups and working together, they successfully escape from predators easily. They are timeserving feeders. Found to roam around castles so that they could feed on ticks and flies while cattle were moving. They are also considered biological pest control agents as they feed on ticks that are found to be dangerous for cattle so they also serve as saviors of cats from disease-causing ticks and shows mutualism relationship (a type of symbiotic relationship where species benefit each other). As the breeding season amongst them varies in different regions it has been observed that they breed from June to August in North India while their breeding season in South India is from November to December. They have some necessary requirements to perform nesting in particular area otherwise they change their habits, food and behavior according to the area and habitat. A good nesting site is one that protects from predators, provides stability and supporting materials so that a strong nest can be built and site should be such that provides easy foraging. As these birds are very adaptive it's easy for them to survive either in rural or urban areas. These birds are considered to be colonial breeders and usually observed in mixed colonies with other species of heron and egrets. Their feeding material depend on the area they are building in their colonies and amongst them few are very common which are listed as :

Grasshoppers, crickets, flies, moths, spiders, frogs, crayfish, earthworms, snakes and rarely on fish.

II. Study Area

The present study was conducted in the Bathinda district of Punjab (India) in June 2022, and the survey started from Sushant City I (Lat- 30.136305 and Long- 74.989378) to Jassi Pauwali (Lat- 30.160419 and Long – 74.978086). The survey started at 7.15 PM and ended at 7.40 PM including all the nearby nesting sites. The next survey at next day started at 5.50 pm from Kotshmir (Lat- 30.132798 and Long- 74.995354) to Talwandi Sabo (Lat- 29.994708 and Long- 75.078105). the climate in the area is typical and the temperature rises to 45°C. The normal annual rainfall of the district is 408mm. The main source of income in the district is from the agriculture sector. The use of the slash-and-burn method is also observed due to which heavy pollution has been observed in the city. Groundwater is available 12 meters below the ground level, and the quality of water is very low due to the presence of excessive chlorides and fluorides and a high degree of TDS. River Sutlej is the nearest river which is about 100 km North. Strong ecological pressure has been observed due to the construction of highways during the lockdown and the loss of many breeding sites for cattle egrets.

III. Materials and Method

The area under study was surveyed for 3-4 or 4-5 days in a month from the first week of April to the last week of August during 2021 and 2022. Two Visits of two or three hours in the morning and evening time of the day (0900-1200 hours and 1700-1900 hours) were conducted for observation. Mapping of concerned geographical area with the help of Google Earth Inc. Frequent visits to mapped areas to check the nesting process of cattle egrets physically. During observation of nest-making activities of related birds first of all tagging of coordinates of the site with the help of a GPS device or mobile application. For direct observation of nesting activity binoculars with 16×8 magnification has been used and for recording, purpose Go Pro Hero 7 camera and capturing photographs good quality DSLR equipped with zoom lenses has been used whereas, counting of nest, eggs, or hatchlings has been done with the help of drone camera keeping a proper height without disturbing the birds. Analysis of nest building material was also done. After the first heavy rain observations were conducted at NH- 54 with (Lat- 30.00888° and Long- 74.773915°) at 1000Hrs and observations made was the dead breeding adult body recovered. Hatchling dead bodies (a few days old) were found. Broken unhatched eggs were also recorded. Photographic data recorded. This was a major finding and the biggest breeding site found to date and nesting was approximately on 50 trees and all trees were *Acacia nilotica* this place named as Pathrala Bathinda- Dabwali highway which is approximately 40KM from the main city i.e., Bathinda, city in Punjab.

IV. Observations:

Here, during the survey from Sushant City I to Jassi Pauwali, the nestings were observed on eight trees between this distance/coordinates. It is observed that hatchlings are out.

1. Maximum birds are with breeding plumage.
2. Sub-adults observed are less in number.
3. Only Cattle egret seen.
4. Juveniles were observed too.
5. A small bridge was there at the observation site.

The observations were recorded in field visits, which were in accordance as explained by Ali and Ripley (1983), Robert (1991) and Joshi and Shrivastava (2012).

In Table I the things that are listed is based on a field visit representing indicator site that consists of five trees on which there are total 122 nests and the clutch size is 15 and all nesting observed is on *Acacia nilotica*. *Azadirachta indica* and other trees were also there but nesting of *Bubulcus ibis* was observed only on *Acacia nilotica*.

Table I: Habitat ecology of cattle egret at breeding site in Sushant city I, Bathinda, Punjab:

Tree no.	No. of Nests (f)	Clutch size (x)	fx
1.	24	3	72
2.	25	3	75
3.	26	2	52
4.	15	3	48
5.	32	4	128
Total	$\sum f = 122$	$\sum x = 15$	$\sum fx = 372$

$$\therefore \text{Mean } \bar{x} = \frac{\sum fx}{\sum f}$$

$$\sum fx = 372, \sum f = 122$$

$$\bar{x} = \frac{372}{122} = 3.04$$

$$S.D(\sigma) = \sqrt{\frac{\sum x^2}{n} - \left(\frac{\sum x}{n}\right)^2}$$

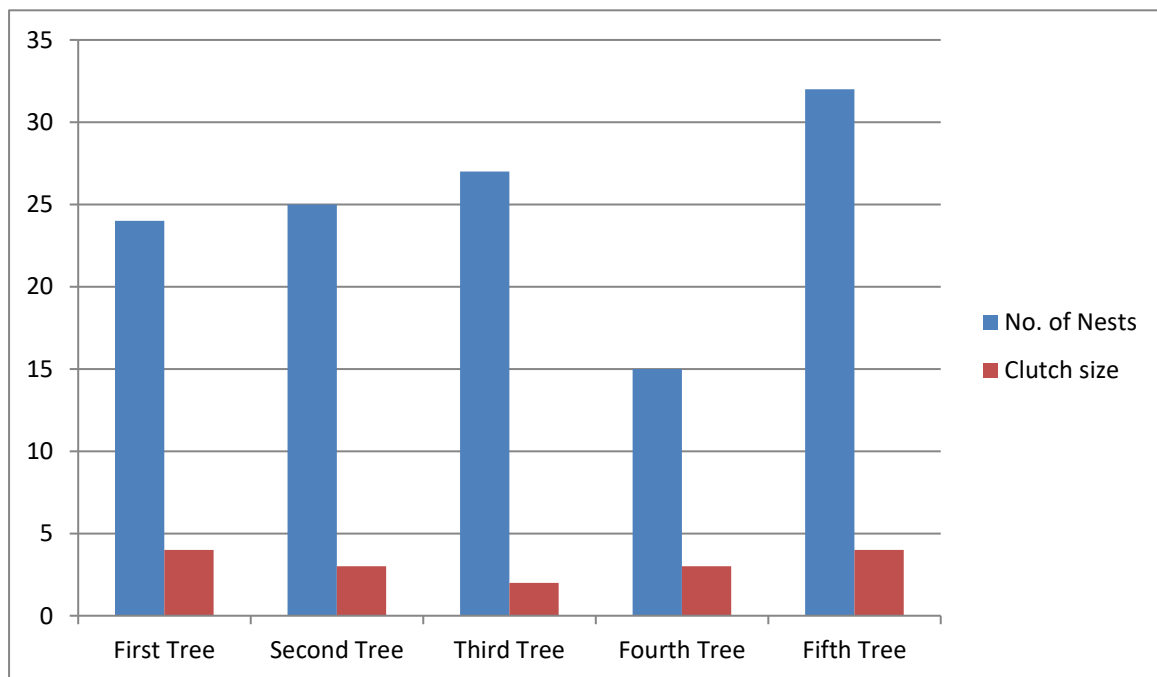
$$x = 47, n = 5$$

$$= \sqrt{\frac{47}{5} - \left(\frac{15}{5}\right)^2}$$

$$= \sqrt{\frac{47}{5} - \frac{225}{25}}$$

$$= \sqrt{\frac{235}{25} - \frac{225}{25}}$$

$$= \sqrt{\frac{10}{25}} = \frac{3.16}{5} = 0.6$$



V. Results and Discussion

Mostly nesting sites of cattle egrets were found in populated areas or places where the activity of humans was observed either in rural or urban areas from where feeding places found to be in range. Here, in Bathinda(Punjab) they found nesting only on *Acacia nilotica*. When the nest was observed with the help of drone, it was revealed that nests were in the shape of multilayered round untidy platforms with dead, stout sticks at base and soft, live and gentle twigs on top of platform; these observations are similar to the remarks of McKilligan (2005). The material used for making nests is the twigs that are broken from the same tree they are living in. The nests look rough and dry in appearance. Leaves, grasses, and other materials are not found in nests. These observations found to be similar with other workers who already wrote papers on similar topic, Nests were mostly found in crowded areas, road side, mixed colonies and nearby water bodies. The average height of the nest from the ground found to be 6.65 ± 1.02 meters. They start making nests from mid-April to end August. After their breeding is complete it was observed that they destroy their nests before leaving. Observation recorded that 2-4 eggs were laid in a nest. The color of the egg was pale blue. Foraging of *B.ibis* was noted in almost all types of ecosystems. They usually feed on insects present in the ground and follow cattle so that they can catch flying insects while cattle move in the ground. They also feed on grasshoppers and ticks present in cattle. They also feed on moths, beetles, spiders, crayfish, frogs, blue bottle flies, cicadas, houseflies, dipteran, maggots, earthworms, fish. The average clutch size and average incubation period (days) were 3.60 and 22.90 in Bathinda respectively.

Both parents were observed incubating the eggs. Average hatching success (%) was 80.0. Previous studies had mentioned the Cattle Egret breeding period from June to August and up to five clutch sizes per season (Ali and Ripley 1974). Gopal et al. (2004) observed cattle egrets sharing their roosting sites with several other birds. Masterson (2007) noted that incubation of the eggs was done by both the male and female and lasted for 24 days. Francis et al. (2012) found that females lay 3 to 4 pale blue eggs, laying one every two days. The cattle egret is a noisy bird with a very strange smell. It smells like decomposing eggs from its breeding sites, which sometimes makes observers very allergic to it causing nausea. They also damage plants, water, and soil. They also destroy bee hives containing *Apis mellifera*. These birds spoils the vegetation as leaves get coated by their wastes and they continue to utilize these trees even after the end/death of vegetation. The small trees that are growing under big trees become dry due to guano deposition by birds as these birds are guanotelic. (Guano is a highly effective fertilizer due to the high content of nitrogen, phosphate, and potassium, these are all key nutrients essential for plant growth but many times this guano is responsible for food poisoning and the destruction of habitats in other ways. Such information was also reported earlier by other scientists. Due to habitat destructions and disturbance caused by human activities, these birds are forced to migrate and during their migration change of behavior and adaptations to the environment has been observed. These birds seem to be fully adapted to noise as it was observed that a large number of colonies were found near bus stands, railway tracks, highly populated areas and the noise caused by humans didn't bother their sites, and no major effects of horns and vehicles seen. Research has shown that activities such as change in environment due to growing industries, urban areas and less agriculture practices, does not make much difference to their nesting as these birds started adapting to rapid changes caused by humans and nature.

Conclusion:

The cattle egret is considered a biological pest control agent and hence is an important bird in an agro-ecosystem (Rao 2004). Awareness programs about this bird are also being conducted in villages to protect them. At many places like Southern part of Punjab, province of India, A rapid change in environment including temperature, rain, humidity occurred due to human activities, construction of building, highways and many more, it was observed that *B. ibis* showed some new adaptations and sites of nesting also changed no of nest are varying while comparing before and after construction and birds are also being forced to move away from its natural habitat but to adaptational behavior, it has been observed that this bird adapts itself to every environment and in previous records it was mentioned about a bird vulture that could not withstand toxicity like diclofenac and oxytocin but cattle egret found to be survived with these toxicity too. Excessive use of chemical elements in agriculture further may increase the toxicity at its peak and we will not be able to save the next line of scavengers, and cattle egrets too may disappear like vultures. So measures and steps should be taken to protect them from toxicity to save our agro-ecosystem. Above mentioned drugs should be banned and more awareness programs should be conducted to protect these birds.

Here, are some pictures which were taken from the research site during the research.

Figure-1: Shows a dead body which has been collected and body measurements have been taken.

Figure-3: This is an indicator site from which their activities have been recorded.

Figure-4: This is also an indicator site which shows when their activities have started for breeding purpose.



collected for measurements.

Figure - 1

Figure-5 : This image represents an egg that was



Figure - 2

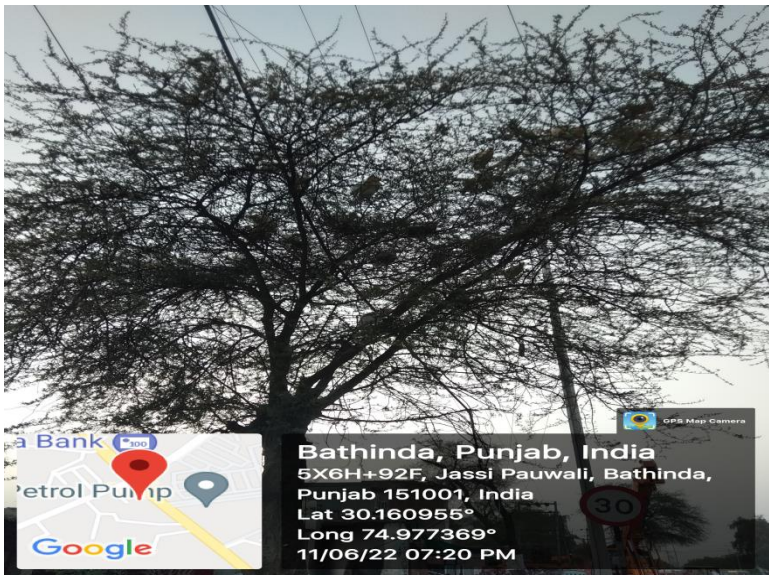


Figure - 3

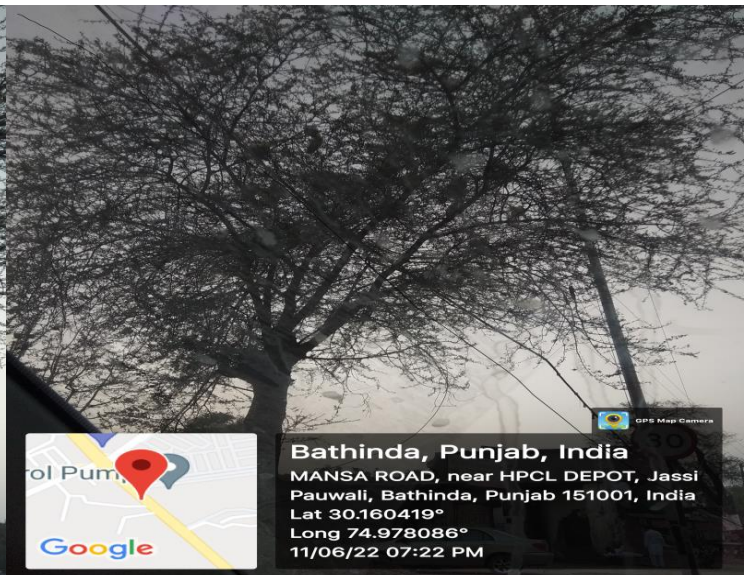


Figure - 4

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