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Study of Certain Behaviours of Red Wattled Lapwings in Sur Sarovar Bird Sanctuary

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Abstract

Sur Sarovar Bird Sanctuary is a Ramsar site which is located within the Agra region of Uttar Pradesh, India. The Red Wattled Lapwing is a resident of South Asia and has distinct vocalisations and ground nesting habits. Field observations were conducted over a six-month period and data related to certain behaviours including feeding habits, courtship rituals and interaction with other species were collected. A finding suggests that Red Wattled Lapwing exhibits strong territorial behaviour with males actively defending nesting sites. The role of vocalisation is not just important in communication but also in mate attraction. They typically forage in groups and use a combination of sight and hearing to locate food. They are omnivorous and hence their diet is beneficial in changing environmental conditions where food availability may fluctuate. They also play a critical ecological role in regulating insect population in agricultural fields as they are insectivorous in nature. They can also serve as bioindicators due to their sensitivity to environmental changes.
Keywords: Vocalisations, Nesting, Courtship, Ecological, Bioindicators

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Introduction

The presence of birds is a good indicator that the ecosystem is in good condition. One of the distinguishing characteristics of the Red-wattled Lapwing, which belongs to the family Charadriidae, is the striking red wattle that covers the eye. In addition to its extensive distribution over the Indian subcontinent, this type of bird is famous for the piercing warning call that it makes. Lapwings normally reproduce between the months of March and June, and males choose which nest sites they will inhabit. The food of these animals consists of vegetable leftovers, beetles, and snails. They live in small flocks close to human settlements, farms, and wetlands (Ali, 2023).

Although the nests of these insects are difficult to see, the females lay their eggs in open areas or even on the ground. This is due to the fact that their eggs have a cryptic colouration, which often matches the pattern of the ground. Through the use of a depression or scrape in the ground, which may be embellished with stones and pellets from goats or hares, they are able to hide their eggs from potential predators. Some study has showed that lapwings set up their nests on roofs in order to protect their eggs from being eaten by predators. According to the Red List of Threatened Species maintained by the International Union for the Conservation of Nature, the Red-wattled Lapwing has been relegated to the "Least Concern" category. This is due to the fact that its population is so large around the world. However, there has been very little study done on their mating behaviours (Ali, 2022). Another widespread wading bird that can be found all throughout the Indian subcontinent is the Red-wattled Lapwing, which is formally referred to as *Vanellus indicus* (Beintema & Muskens, 2021). As of right now, it is classified as being of the Least Concern category by the International Union for the Conservation of Nature. As is customary for Charadriidae, the species lays a clutch of three or four eggs in a small hole or scrape on the ground. This is the normal behaviour of those species. Grassy fields, unoccupied lots, dry riverbanks, and open countryside are the typical locations with which hens lay their eggs (Bird Life International, 2017).

During the incubation period, which may last anywhere from 28 to 30 days, both sexes are involved for the process. It is possible for eggs to be lost due to a number of factors, including grazing animals, human operations (like ploughing), and a wide range of predators (including mongooses, ravens, kites, and dogs). An example of ground-nesting The Red-wattled Lapwing had a successful nesting rate of 40.54 percent overall, with 30 young birds successfully escaping and 39 eggs hatching, which is equivalent to 52.70 percent of the total (Clark, 2017).

There have also been isolated reports of this species depositing its eggs on urban roofs that are flat and strewn with stones (Desai & Malhotra, 2023). This is a very unusual occurrence. In nations such as South Africa, Canada, and the United States of America, it has been observed that some species of ground-nesting birds nest atop roofs within their territories. It has been observed that in many countries, the number of birds that nest on roofs, such as terns and gulls, has reached or even exceeded the number of birds that nest on the ground (Gregory, *et. al*., 2023). Some people have proposed that the use of flat roofs as nesting platforms by ground-nesting birds is an adaptation technique that they use in order to compensate for the loss of their typical nesting locations that rapid urbanisation has produced (Grimmett,*et. al*., 2019). In addition, there is some evidence to suggest that animals that are grazing, humans, and the majority of mammalian predators are less likely to do damage to animals that are living on roofs as opposed to those who are living on the ground (Hart, *et. al*., 2022). It is possible that the natural habitat of red-wattled lapwings has been destroyed, which might be the reason for their tendency to nest on roofs. At this point in time, there is a dearth of study that investigates the factors that have led to this alteration in the breeding grounds of the species (IUCN 2021).

Research Methodology

Study Area- the Soor Sarovar Bird Sanctuary in Agra may be found at 27o 15'N 77o 50'E on Mathura-Delhi National Highway no. 2. The sanctuary is bordered by agricultural land on one side and the Yamuna River on the other. It has about 400 hectares of forest cover and 240 hectares of water, which is called Keetham Lake. Rainfall ranges from 517 mm to 750 mm, while temperatures vary from $5o^C$ to $48o^C$. In the centre of the sanctuary is the lake surrounded by many artificial islands. Wading birds find suitable nesting and feeding grounds along the coast and on the island.

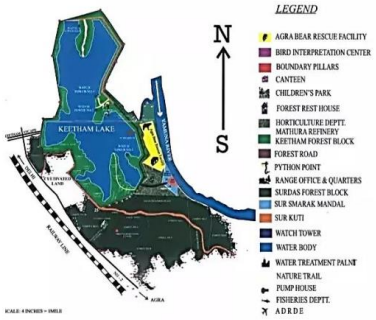

Fig.1: Soor Sarovar Bird Sanctuary in Agra shown on a map

Research Design

In all, six bird pairs were used in the research. From March 2024 until August 2024, the research was conducted. We took great care not to disturb the birds as we made our observations. With the goal of keeping birds in the dark about human activity. A fabric covered a 6-foot-tall frame with two tiny holes cut into it to accommodate the study's requirements for nidification, courting behaviour, etc. To help the birds adjust, this "hide" was kept close to the nest for two or three days. The measurements were obtained every day between dawn and nightfall using just the human eyes. A Nikon camera was used to capture the images. Using a thread and a scale, we were able to determine the average size of the eggs deposited by the birds. The research of these endangered birds has been approved by the college's ethics committee.

Result and Analysis

Courtship Behavior-Soor Sarovar Bird Sanctuar saw the birds flying in couples from March 18th to 22nd, 2024. At each location, the male took the lead in wooing. The male extends his fanned tail towards the female, who is then approached while standing tall with its neck spread out. In order to attract a mate, a male bird will display tumbling flights and sing. His breast will be completely inflated. Short, rapidly repeated cries were the female's response to the male's antics. Pair formation included a variety of behaviours, such as displaying a fanned tail, performing shallow quick wing beats, and making a variety of sounds.

Number of mates- It was found that the task of raising the young was shared between the parents.

Territory- A territorial dispute arose between the nesting pair and the area immediately around it. Parents take extra precautions to prevent outsiders from entering this sensitive location. Prior to delivering a call note to a female, a male must first secure a territory. When a female bird arrives, the male bird will joyously squawk and spin around in the air to meet her. When threatened, these birds make piercing noises and sing a distinctive song to draw attention to their area and ward off potential predators.

Nest Construction and Nesting Material on April 2, 2024, construction on the Nest began. Construction of the nest began in the wee hours of the morning and continued until midday on two separate days. When creating a nest, both parents pitch in about equally.

Clutch Size- It was found that lapwings typically lay a clutch of four eggs. From April 8, 2024, through April 14, 2024, the eggs were laid on alternating days. During the afternoon, the eggs were deposited. The parent bird was able to incubate the eggs more easily because they were laid out in such a way that their little ends met in the middle. It was noted that the bird was rearranging the jumbled eggs.

Eggs- The eggs belonged to the plover species and were wide at one end and pointed at the other. Their colour ranged from a reddish buff to a light olive green, and they had a pyriform shape. The eggs' surfaces were covered with deep brownish-black dots or patterns. On average, the egg size ranged from 1.2 to 1.6 inches.

Incubation- Sitting on the eggs, lapwings allowed them to incubate. The first egg was laid to begin the incubation process. The responsibility of sitting on the eggs was shared by both sexes. The majority of the work was done by women, although men helped out considerably. After three weeks and four days, incubation was complete. During the summer, birds would often moisten their breast feathers in order to maintain the moisture of their eggs.

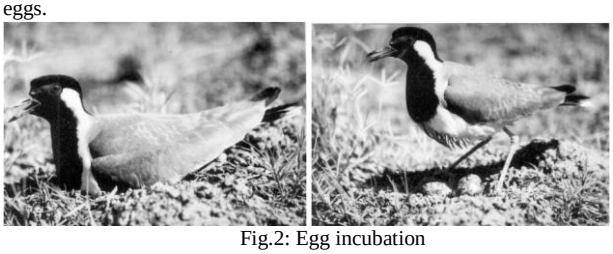

Fig.2: Egg incubation

Hatching pattern- From 4 May 2024 onwards, in the same sequence in which they were deposited, young hatched one by one, every 46 to 48 hours. There was no delay in hatching.

Fig.3: Layout of lapwing hatching

Physical features of hatchlings- Down feathers of a brownish hue adorned the hatchlings. Their upper bodies were a speckled blackish-grayish brown. Boasting a large white collar and a black pectoral band, these horses featured buff-colored flanks and belly and white-tinged underparts. There were nidifugous chicks just out of the coop. These premature infants were nurtured by their parents. When the young were dry and mobile, they left the nest without a second thought. They blended in with their environment because to their dark colour. Within three to five weeks, they were flying.

Fig.4: Characteristic of hatching

Brood care and feeding- Overnight, the protective mother bundled her newly born chicks in warm blankets. The male and both females took turns shielding them from the scorching heat throughout the day. After five days of the initial hatching, day brooding comes to a halt. After around 16 days of night brooding, the chicks were partially fledged. As soon as they saw an intruder or threat, the nesting couple crept away from the nest and started calling to scare them away. The nesting bird would squat down stealthily on the eggs or young to protect them from predatory birds that soared above.

Fig.5: Support for broods

Behavior of the nestlings- The young birds were precocial and nidifugous. As soon as they hatch, they begin to race about. Feathering from birth, they were able to provide for themselves. The only thing their parents could do to keep them safe until they learnt to fight was to watch over them. After taking a few steps away from their nest to eat, the young birds paused, pecked, and then stood up straight. While the parents kept a close eye on them, the chicks were able to feed and be safe on their own. Whenever their parents made a dreadful noise or sounded an alarm, the kids hid behind nearby plants or pieces of rubbish.

Nest sanitation- The nest was maintained neat and tidy by lapwings. Taking the eggshells out of the nest when they hatched had a dual purpose: cleaning the nest and hiding the eggs. The young birds were precocial and nidifugous. As soon as they hatch, they begin to race about. Feathering from birth, they were able to provide for themselves. The only thing their parents could do to keep them safe until they learnt to fight was to watch over them. After taking a few steps away from their nest to eat, the young birds paused, pecked, and then stood up straight. In spite of the parents' best efforts to keep them secure, the chicks were able to feed themselves. Whenever their parents made a sound like an alarm or a warning note, the kids would hide in the bushes or behind some rocks.

Nest sanitation- The nest was maintained neat and tidy by lapwings. After hatching, the eggshells were taken out of the nest, which served as a cover and a means of cleanliness.

The Chick Behaviour- Precocial, meaning their eyes were open and their downs quickly dried, the freshly born chicks were a sight to see. On top of the brownish-colored head and trunk were irregular black patches. White predominated on the neck, rear of the neck, and underside of the trunk. Contrasted with the backdrop, the figure's torso bears enigmatic patterns. At the very tip of the black beak was a tooth that looked like an egg. The freshly born chicks had an average weight of 13.65 gram (n=3). The chicks remained close to the nest until all of their eggs had hatched. Nevertheless, a chick might be spotted nibbling on the ground near the nest as little as thirty minutes after hatching. When the fourth chick hatched, the parents were occupied with caring for the third one in the nest, while the older two were free to explore the area around the nest. When the eggs were still developing, the mother would sometimes assume a dome-like position in the nest, creating a "wing chamber" that concealed the young inside. After the eggs have hatched, the parents and chicks often leave the nest and go to the nearby field to be safe and get food. The parents did not seem to be feeding any of the young. Chicks were seen sucking moisture from their parents' damp belly feathers during the first week of their lives. As soon as the parents made their warning sounds, the chicks dove under the grass for shelter or stayed perfectly motionless. Chicks were seen feeding on the same damp field as their parents in the case of some isolated nesting sites around one week later. July was a sight to see, as parents carried their fully feathered young into the fields. Around the 35-38 day mark, fledging takes place.

Discussion

The wattled As of recently, the taxonomy designation for lapwings has been changed from *LobiVanellus indicus* to Red *Vanellus indicus*.There has been a significant increase in the location of this species' range. It maintains a well-defined and aggressively guarded territory for the benefit of the young that it produces. Beginning now is the process of selecting an area in which to construct a nestling. In the course of studies on site selection, birds have been the topic of study. The area may only be selected and claimed with the consent of both parents when a pair of pigeons or doves has formed at that point in time. Further, they said that every mating partner has its own territory that encompasses the whole nest area (Johnson, 2020). By swooping down on their adversaries, landing on top of them, or even smashing their heads with their curved wings, pigeons are able to defend their territory (Khalil, *et al*., 2019). Doves, both male and female, defend

their territory by luring potential intruders away from the places that they have identified as their domain. By demonstrating that the mating pair did, in fact, maintain a territory around their nest, this study gives credibility to the arguments that were made by the authors we referenced earlier. In this location, the parents firmly enforce the restriction that no others are permitted to enter (Koshy, 2023). These birds emit piercing sounds and sing a territorial song that attracts attention to themselves in order to guard against anyone who may try to invade their territory. Through the use of a call note, a male will communicate with a female when he has successfully established his territory. When the female bird arrives, the male bird is thrilled and squawks with excitement. He becomes quite happy (Mishra & Kumar 2020). The courtship behaviour of these birds may be determined by the mating call. It is via singing, show flying, and imitative displays that the male bird interacts with the female bird. Avocets from the United States have been shown to display behaviour that is comparable.

Monogamy is often practiced by these birds since it offers advantages to the act of providing parental care. Additionally, it has been shown that Western Gulls are responsible for providing parental care. The lapwing takes immense precautions to ensure the safety of its young by ensuring that its area is well delineated and vigilantly maintained. The new study lends support to the conclusions of the previous author with regard to the selection of a nesting location. One other role of territory is to provide protection and concealment for youthful populations. It is common for lapwings to construct their nests in the open air, and in some cases even on top of buildings (Saxena, 2021). During this process, they keep their camouflage plumage in order to protect the eggs they lay. They create a small pit in the ground and then fill it with stones after excavating it themselves. If everything were perfect, it would be located next to water. For the purpose of lining the nest that the male has scraped from the ground, the female will wait until she finds acceptable local materials. In April, lapwings, like other passerine birds, begin making their nests in the early hours of the morning and continue doing so until the late afternoon throughout the duration of the month (Saxena, 2023).

A Nesting and Nidification Process The spoonbill, also known as Platalea leucorodia, is being studied by researchers in the Westerghat Region of Shimoga, Karnataka, and other parts of India. Nesting behaviour, nesting site selection, habitat, nesting material, nest size, and nidification are some of the topics that are covered in this article on the life cycle of Platalea leucorodia. Experiments on nidification have been conducted on a variety of animals in recent years, including the Indian grey horn bill, the black-headed ibis pig, the pegion, the dove, the Spot-billed pelican, and other tropical birds. Keeping the nest clean and organised was the responsibility of the lapwings (Sethi, *et.al.*, 2021).

Immediately after the eggs had hatched, the eggshells were removed from the nest with great care. The fledgling birds took a few steps after emerging from the egg, halted for a while, pecked, and then rose up to their full height. The fact that baby bears were able to feed themselves and had feathers is something that should be taken into consideration. Prior to the time when children are able to learn how to protect themselves, their parents are their major source of security (Ganesh & Achyuthan 2020).

Conclusion

The behavioural patterns, ecological relevance, and adaptive tactics of Red Wattled Lapwings may be better understood via the study of these birds in the Sur Sarovar Bird Sanctuary. There is strong evidence from these observations that territorial behaviour is an important part of their nesting behaviours, with males aggressively protecting their breeding places. Communication has a crucial part in mate selection, as shown by courtship rituals that include unique vocalisations and showcase flights.The significance of lapwings in maintaining ecological harmony is further highlighted by the study. Along with their function as ecological regulators, their omnivorous diet—which is mostly insectivorous—helps to manage pests in agricultural areas. Furthermore, their ability to detect changes in their surroundings raises the possibility that they may be used as bioindicators to measure the state of habitats.Extensive documentation of nesting and parenting behaviour revealed that parents worked together to raise their chicks. Lapwings love to nest on open ground and use their natural camouflage to stay hidden, according to the research. Existing information on the species' reproductive behaviours is supported by the documented incubation duration of 28-30 days and hatching success rate, which agree with earlier research. In sum, the findings of this study add to our knowledge of the ways in which Red Wattled Lapwings adapt to their surroundings. Their nesting grounds are particularly vulnerable to habitat degradation and human disturbances, which is why conservation efforts are necessary. More research on the effects of urbanisation on nesting success and long-term population trends would be a boon to bird preservation initiatives.

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