

# Peculiar choice of nesting of Red-wattled Lapwing *Vanellus indicus* in an urban area in Mumbai, Maharashtra

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## Abstract

In this age of urbanisation, certain birds have started to adapt to the rapid anthropogenic changes to the environment. This is exemplified by the Red-wattled Lapwing *Vanellus indicus*, a ground-nesting species that is now known to breed near dense human habitation, and even on the roofs of buildings. A pair of lapwings was observed over a period of four years in Deonar, Mumbai, on a corrugated asbestos roof of a bungalow. Breeding behavior was studied during the years 2008 and 2011, from February to May. Specific parameters quantified were: clutch size, incubation period, behavior of both parents, hatching success, mortality of the chicks, and possible causes of mortality. Roles of the parents were observed from a few days prior to nest construction upto the time when the chicks were no more sighted. This communication not only presents the description of successive nesting attempts at the same location, but also provides a review of other such notes on this species.

## Introduction

Wildlife conservation in urban habitats is rapidly gaining importance as urban areas expand exponentially, covering larger areas leading to losses in native biodiversity (Jokimaki *et al.* 2005). With the spread of suburbia, however, comes the opportunity for some species to take advantage of new resources (DeStefano & Degraaf 2003). There are growing instances where some species are beginning to adapt to urban conditions (Hansen & Beringer 1997; Beck & Heinsohn 2006). However, generalist scavengers and predators benefit excessively from anthropogenic changes, increasing predation on the native wildlife vulnerable in urban habitats (Andr n 1992; Kristan & Boarman 2003; Marzluff & Neatherlin 2006). The Red-wattled Lapwing *Vanellus indicus* is a plover that resides in the open countryside, ploughed fields, grazing patches, and margins and dry beds of water bodies, in parts of Asia (Ali 1996). It is monogamous and a highly territorial breeder. Lapwings are known to occupy areas that have

dense human population (Piersma & Wiersma, 1996) and are commonly sighted in urban areas within Mumbai city limits of Maharashtra state. In natural conditions, its eggs are laid in a 'ground scrape' or a depression, sometimes fringed with pebbles and goat, or, hare droppings (Sharma 1992), although there are reports of breeding on buildings in cities (Mundkur 1985). Here, we report observations of the breeding of a pair of Red-wattled Lapwings, over a four-year period on a corrugated asbestos roof of a bungalow in Mumbai.

## Study area & methods

The study was undertaken in Deonar, Mumbai (19°03'00.55"N, 72°55'07.33"E), an urban area dominated by residential and commercial buildings and busy roads, with a few patches of gardens (10). A pair of Red-wattled Lapwings was observed between the months of February and June in 2008 and 2011. They frequented a plot of land with a single storey bungalow with



10: The bungalow, on the roof of which the lapwings nested. The arrows indicate their nesting site in 2008 and 2011. Photos: A. Muralidhar

a small patch of open land situated right behind it. Local people use this open area for their morning ablutions. There are a few smaller buildings, with sloped and flat roofs, nearby (~200 m). The lapwing pair flew to these roofs for brief periods, often in the evenings. An open well is situated about 30 m from the bungalow. People use its water for bathing, and washing clothes and utensils; thereby the study area is usually almost always showing the presence of human beings.

The nest site was first spotted on the corrugated asbestos roof (~18 m x 10 m) in 2008, when the birds were found frequenting one particular area on the roof. Subsequently they were seen incubating eggs in the same place. Observations were regularly made between 08:00 hrs and 18:30 hrs and lasted for about a month after hatching. Observations were made using a pair of 12x24 5° Pentax binoculars. Photographs were taken from an adjacent building's terrace, using a Sony H7 camera with a 15x optical zoom. Hatching success, parental care, and foraging habits during the incubation period were recorded. In addition, their behavior towards potential predators and human beings was also noted.

## Results

**Mating:** The pair was seen mating in early March (11). They mated several times during the day at intervals of 20–25 min., mainly in the morning and evening. This behavior was characterized by a

slow “tit-tit-tit” call by the male, when he approached the female, followed by a rapid “tit-tit-tit” when he mounted her. In 2011 mating was observed even after the first egg had been laid.

**Nesting attempts:** The pair was observed near the bungalow in all four years of observation (2008–2011). No other lapwing pair has been sighted in this area. In general, this pair foraged together and was never perturbed by dogs, or by human beings, moving in the vicinity.

A single nest was observed in both, 2008, and 2011, and chicks were observed in both years. Although the pair was often seen for extended periods on the same roof during the breeding seasons of 2009 and 2010, no nests or young were observed, and it is presumed that the birds did not breed.

The nest (11i) was constructed on the same side of the roof in both the years.

**Nest construction:** By the end of March 2008, one of the birds settled down in the middle of the completely exposed roof of the bungalow. Both birds participated in nest building about 15 days prior to laying eggs. However, the beginning of nest construction was not marked by any explicit behavior. Initially, the pair scraped off the upper layer of the hardened material coating the asbestos roof, using their beaks (11i). Some pebbles and chips of the material that was scrapped off were picked up from the vicinity and dropped near the nesting site. One bird was observed sitting at the nesting site more often than the other bird, although it was



11: (clockwise from top left): Bi: Nest of the red-wattled lapwing pair on the roof; Bii: Mating observed in March. (This image was taken in March 2011.); Biii: Nest with the first egg; Biv: Nest showing two eggs; Bv: Nest showing three eggs; Bvi: Nest showing four eggs.

not possible to differentiate between the two sexes.

**Clutch size and incubation:** In both years, four cryptic eggs were laid over a period of four days (**11iii-vi**). In 2008, one egg was laid, separately, in a depression of the roof, and remained unattended by both birds during the entire incubation period, while in 2011 all four eggs were incubated. Both birds shared incubation duties. They changed 'shifts' mainly in the afternoon when the heat was intense. One bird would sit on the eggs, while the other remained within 10 m of it, at the edge of the roof, where there was shade. Both the birds were often seen resting on their tarsi when on the nest. The incubation periods for 2008 and 2011 were 31, and 33 days respectively.

**Nest protection:** During the incubation period, House Crows *Corvus splendens*, Jungle Crows *C. macrorhynchos*, and Black Kites *Milvus migrans* were actively driven away. The pair was particularly threatened by presence of Cattle Egrets *Bubulcus ibis* on the roof. They tried to drive them off the roof; but the egrets in turn drove them away. After that, the lapwings did not disturb the egrets, and both shared the roof. The pair was not hostile to House Sparrows *Passer domesticus* and Common Mynas *Acridotheres tristis*, even if they came very close to the nest. The eggs were never abandoned for more than a few minutes at a time. In the presence of many crows, the bird on the nest would keep its head low and beak pointing towards its body until the crows dispersed. The only occasion where both birds left the nest for a significantly long period of time was when they aggressively attacked a Black Kite that was hovering very close to the nest.

**Hatching & mortality:** By the end of the 2008 incubation period, only two, out of three, eggs remained and hatched (**12i**). In 2011, three out of four eggs hatched (**12ii**), indicating a hatching success of 50% and 75% respectively. The broken shells were cleared away from the main nesting area and dropped into an outer circumference. The pair was not seen removing the pieces from the roof, but just from the main nesting area. We did not directly observe any predation on the two clutches. Interestingly, in both the years, hatching began on 25 April. In 2008 the two chicks were last seen on the rooftop, two days after hatching. In 2011, the three chicks were spotted on the ground two days after hatching (**12iii**). They were last spotted in the evening of 28 April 2011 (three days after hatching), in the small scrub area behind the bungalow.

**Anti-predator behavior:** Once the eggs had hatched, both parents were constantly vigilant and called incessantly. They remained active at all hours and were often heard even past midnight, probably driving away potential predators. On the first day, the chicks were seen hiding under the wings of the adults at any sign of danger. Later, they began to squat and curl into a ball, putting their heads down when Black Kites were hovering above them or when House Crows were close by. Their cryptic colouration made it difficult for us to observe them continually

as they remained well camouflaged (**12**). Most of the time, it was the lapwing parents that gave away the position of the well-camouflaged chicks. When on the ground, the parents were seen aggressively chasing away crows, and even domestic dogs that came close to the chicks.

## Discussion & conclusions

It is well known that ground-nesting birds are vulnerable to high rates of depredation of their eggs and young (Armstrong 1954; Massey & Fancher 1989; Salek & Smilauer 2002). Human threats to ground-nesting birds, are either direct *i.e.*, damage to nest or young ones, or indirect *i.e.*, habitat destruction and augmenting predator populations (Jayakar & Spurway 1968; Santharam 1995; Fletcher *et al.* 2005), or by the inadvertent trampling of eggs or chicks by cattle (Taej Mundkur, *pers. comm.* 2011). The locality under consideration has a very high degree of human interference, livestock, and potential predators. These factors could be the main reasons for the pair to nest at this elevated site. There have been several reports of unusual nesting sites on rooftops by this species across India (Saxena 1974; Reeves 1975; Tehsin & Lokhandwala 1983; Mundkur 1985; Koshy



**12:** (clockwise from top left): Ci: The two chicks resting on their tarsi, with one of the parents, on the roof in 2008; Cii: The three chicks of 2011; Ciii: One of the chicks (of 2011) seen on the ground, indicated by the arrow.

1989; Kumar & Sharma 2011). While most cases reported high hatching success (Tehsin & Lokhandwala 1983; Mundkur 1985; Kumar & Sharma 2011), the mortality rate of the chicks in most documented cases was 100%, and could be related to birds nesting on higher buildings (Mundkur 1985), or other, unexplained factors. Compared to these studies, the hatching success in the present study was low (50% and 75% in 2008 and 2011 respectively) while the mortality rate of the chicks was 100% in both years. Although not directly witnessed, we assume mortality of all chicks, once they were on the ground, in both years, for two reasons. Firstly, the parents were seen for extended periods on the roof even after the chicks were last observed, and secondly, the adults did not display any anti-predatory behavior nor were they vigilant or vocal as they were when the chicks were present and visible.

The two clutches that we observed, with four eggs in each, are within the range of 3–4 eggs reported by Ali & Ripley (1980), and Kumar & Sharma (2011).

We attribute the disappearance of the two–three day old chicks in our study to predation considering the omnipresence of predators including Black Kites, crows, and domestic dogs and cats in the area. In a study of ground nesting families of Red-wattled Lapwings by Desai & Malhotra (1977), it was suggested that chances of survival were much better for the chicks after they reached the age of two weeks.

From our observations of Red-wattled Lapwing and those of other authors listed above, it appears that this species is adapting to urban settings and choosing a nest location to minimize human and livestock interference. In adapting to nesting on buildings, the chicks need to be able to safely descend to the ground, and it remains an interesting question as to how these chicks reached the ground without injuring themselves. In our study, we did not see how the chicks managed to reach the ground, though Kumar & Sharma (2011) stated that Red-wattled Lapwing chicks, spotted on the roof, descended to the ground using a rainwater drainage pipe without injury.

People in many parts of the world are beginning to encourage wildlife to thrive in cities and towns. Human commensal predators, like dogs, cats, rats, and House Crows however, are often found in excessive numbers around human habitation and they are detrimental to growing urban wildlife populations (Hahn & Romer 2002; Boarman *et al.* 2006). We believe increased awareness among people, better civic infrastructure, like timely garbage disposal, pest control, and eco-friendly urban planning through creation of green areas and corridors, can aid in managing the number and distribution of commensal predators, which in turn will significantly help adaptable species like the Red-wattled Lapwing to gain a foothold in the concrete jungle.

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