

Eggs morphometric parameters of Red-Wattled Lapwing (*Vanellus indicus*) in Kapoori Govindpur, Saharanpur, U.P., India

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Abstract

In this study we analyzed morphometric parameters of the 22 eggs from 06 clutches of Red Wattled Lapwing (*Vanellus indicus*). The bird is a monogamous in nature. It breeds from March to August and majority of eggs are laid in April to June. Female lays 3-4 eggs. Nests are difficult to find as eggs usually match with the surrounding ground pattern. The morphometry of eggs of Red Wattled Lapwing was observed during March to June 2020 in agriculture land of Kapoori Govindpur, Saharanpur, U.P., India. Six clutch size in which 22 eggs were recorded in the ground nest. Average length and breadth or width of eggs are (L × W) 4.03 X 3.07 cm. The egg volume are 19.91 cm³. Average weight of an egg was 17.93gm. and average egg shape index (ESI) was 76.21. Egg size is influenced by climate, the amount of available food, parent's body size, evolutionary status and also some other factors.

Keywords: Morphometry of egg, length, width and volume of egg, red Wattled lapwing and egg shape index.

Introduction

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). Lapwings are known to occupy areas that have dense human population (Piersma and Wiersma, 1996). The red-wattled lapwing is a terrestrial bird of open fields. The red-wattled lapwing is an Asian lapwing or large plover. This bird belongs to the family Charadriidae of the order Charadriiformes. They prefer to live in outskirts of towns and villages in open fields near wetlands and are often found in pairs or trios. It shows a preference for sites in close proximity to freshwater. It is a monogamous bird and breeds from March to August. The average size of 100 eggs was 4.21 X 3.03cm (Patel and Dhandhukia, 2015). Typical nesting habitat includes open country, grazing land, fallow fields, dry beds of village tanks, and islets in rivers (Ali & Ripley 1998). The incubation period ranges from 28 to 30 days and both sexes perform incubation duties (Desai & Malhotra 1976, Ali & Ripley 1998).

Eggs are lost to an array of predators (e.g. mongooses, crows, kites, dogs), to human activities (e.g. ploughing) and to trampling by grazing animals (Naik et al. 1961). Desai & Malhotra (1976) studied the nesting success of ground-nesting Red-wattled Lapwing and observed that out of 74 eggs laid 39 (52.70%) hatched successfully, and ultimately 30 young fledged, leading to an overall nesting success of 40.54%. Additionally, this species has occasionally been observed to nest on flat pebbled roofs in urban environments (Mundkur 1985, Grimmett et al. 1998). The courtship involves the male puffing its feathers and pointing its beak upwards. The male then shuffles around the female. Several males may display to females and they may be close together (Vyas,

Rakesh 1997). The eggs are laid in a ground scrape or depression sometimes fringed with pebbles, goat or hare droppings (Sharma 1992). About 3–4 black-blotched buff eggs shaped a bit like a peg-top (pyriform), 42x30 mm on average. Nests are difficult to find since the eggs are cryptically coloured and usually matches the ground pattern (Ali, S & S D Ripley 1980). Roof-nesting has been also observed (Dwyer et al. 1996, Crawford & Dyer 2000). Use of flat roofs for nesting has been suggested as an adaptive response of ground-nesting birds to the loss of traditional nest sites and habitats subjected to rapid urbanisation (Baumann 2006). Additionally, roofs have been suggested to be more protected from humans, most mammalian predators and grazing animals when compared to open ground (Douglass et al. 2001). Loss of natural habitat has been suggested as a possible reason for roof-nesting by Red-wattled Lapwing (Mundkur 1985). However, no studies have so far been conducted to ascertain the reasons causing such a shift in the species's nesting habitat. The knowledge and information on morphometric characteristics is therefore essential for understanding an animal and its reproductive biology in particular (Danilov, 2000).

Materials and Methods

The field work was carried out during the breeding seasons of March to June 2020 at the radius of 1.0 km. of Kapoori Govindpur, Saharanpur. Which latitude is 29.785258°N and longitude is 77.7373396°E and 269 meters above the sea level. Egg length and width of 22 eggs from 06 clutches were measured by using Vernier calliper, while egg weight was measured using digital weight balance. Number of eggs damaged and hatching success was also observed. The observations were recorded in the early morning and evening hours. In this study, the nesting sites, nests, eggs, chicks, juvenile of the bird, and adult birds were not harmed in any way. Eggs volume and egg shape index were recorded with the help of mathematical equation as per given by Bored (1999).

Formula of egg volume (V) = $0.52 \times L \times B^2$

Where V = Volume of egg, L = Maximum length, B = Maximum breadth and 0.52 is a constant for external ellipsoidal volume.

Formula of egg shape index (ESI) = $B/L \times 100$

Where ESI = Egg shape index, L = Maximum length, B = Maximum breadth.

Result and discussion

In early breeding season, both male and female red-wattled lapwing bird were responsible for the selection of nesting site. Birds take 11 to 27 days in the selection of nesting site (Lamba, 1963g). Distance between breeding and feeding sites (abiotic and biotic components) also played an important role in the selection of breeding sites, along with safety from predators and inter-specific competition (Dhandhukia and Patel, 2012). Selection of nesting site is considered to be one of the most important factors in reproductive success in many species of birds (Li and martin, 1991) and it has been recorded that in some species, reproductive success has been reduced due to poor nest site selection (Frederick, 1986). Any physical measurement of nests (size or nesting materials used) should be done after the nestlings have fledged from the nest. It was observed that maximum nest material act as insulator that is help in decreasing heat exchange result play an important role in eggs incubation (Panicker 1980). The red-wattled lapwings prefer nesting sites close to water. The nest is a shallow scrape which may be bare or lined with small stones. Both of the pair take part in nest building, incubation and care of chicks. When the nest construction activity completed then egg laying process start. The female red-wattled lapwing lays eggs on alternate days and the typical clutch contains four eggs. The eggs are pyriform (pear shaped), colour pale olive green or buff with blackish brown

spots and markings. Also this type of research done by others (Lamba, 1963c, Dhandhukia and Patel, 2016). Nests are difficult to find since the eggs are cryptically coloured and usually matches the ground pattern (Ali, S and S D Ripley 1980). During this study six clutch size in which 22 eggs were recorded in the ground nest. Average length and breadth or width of eggs are (L × W) 4.03 X 3.07 cm. The egg volume are 19.91 cm³. Average weight of an egg was 17.93gm. and average egg shape index (ESI) was 76.21 (Table 1). The egg size in birds is determined genetically with an efficiency factor to 70 %, while the effects of environmental conditions, such as feeding resources, altitude and ambient temperature at last 3-4 days before egg-laying, are relatively restrained (Fogor and Pegoraro, 1996). Egg size is influenced by climate, the amount of available food, parent's body size, evolutionary status and some other factors (Stadelman and Cotterill, 1995). The average size of 100 eggs was 4.21 X 3.03cm (Patel and Dhandhukia, 2015). Typical nesting habitat includes open country, grazing land, fallow fields, dry beds of village tanks, and islets in rivers (Ali & Ripley 1998).

Table 1. Morphometric Parameter of eggs of red-wattled lapwing, during study-

S.N.	Length (cm)	Breadth (cm)	Egg Volume (cm ³)	Egg shape index (ESI)	Weight (gm)
1.	4.28	3.00	20.03	70.10	18.94
2.	4.10	3.12	20.75	76.10	17.88
3.	3.96	3.02	18.78	79.51	16.82
4.	4.00	3.08	19.73	76.26	17.52
5.	4.10	3.12	20.75	76.10	19.60
6.	3.96	3.02	18.78	79.51	16.82
7.	4.06	2.98	20.75	73.40	15.82
8.	3.98	3.10	19.88	75.60	19.56
9.	3.88	3.08	19.13	79.38	18.86
10.	4.10	3.12	20.75	76.10	17.88
11.	4.00	3.08	19.73	76.26	17.52
Range	3.88-4.28	2.98-3.12	18.78-20.75	70.10-79.51	15.82-19.60
Average	4.03	3.07	19.91	76.21	17.93

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