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## First record of a regularly occupied nesting ground of Yellow-wattled Lapwing, *Vanellus malabaricus* (Boddaert) in agricultural environs of Punjab with notes on its biology

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Amongst the three resident species of Lapwings reported from Punjab, the Yellow-wattled Lapwing, *Vanellus malabaricus* (Boddaert) is considered as a rare bird in Punjab. Except for some scattered sightings, to date, there has been no report of regular presence of Yellow-wattled Lapwing inhabiting a particular area in Punjab. During the present study spanning over a period of 12 months (January 2014 - December 2014), the hitherto unrecorded continuous occurrence of a group of individuals in a particular area (latitude: 30; 43; 52.60 N & longitude: 76; 09; 54.59 E) situated alongside the Delhi-Ludhiana National Highway past Khanna city have been noticed. In the months of April-May 2014, the two pairs of individuals laid a total of four clutches consisting of four eggs each. Preliminary observations have been made on its feeding, nesting and breeding biology. The presently recorded habitat is a private land and the lapwing individuals are facing twin threats of habitat deterioration and its eventual destruction. The study necessitates immediate initiatives for conservation and rehabilitation of this habitat, sustaining the continuous survival of this rare bird.

**Keywords:** Yellow-wattled Lapwing, *Vanellus*, Punjab, rare, habitat.

**1. Introduction**

Lapwings belong to family Charadriidae of the avian order Charadriiformes. They are medium-sized wading birds with long legs, short straight bill, fairly large head and rounded wings<sup>[1]</sup>. Out of the seven species of Lapwings reported from the Indian Subcontinent three species viz., River Lapwing, *Vanellus duvaucelii*, Yellow-wattled lapwing, *V. malabaricus* and Red-wattled Lapwing, *V. indicus* occur as resident birds in the Northern India, including the State of Punjab<sup>[1, 2, 3, 4, 5]</sup>. Amongst these resident Lapwings, the River Lapwing is confined to the sandbanks and shingle banks of the rivers, whereas the Red-wattled Lapwing being the most common one inhabits any sort of open country, preferably in the vicinity of water. Contrastingly, the Yellow-wattled Lapwing inhabits dry stubbles, bare lands, fallow fields and open dry country<sup>[1, 2, 3, 4, 5, 6]</sup> and also the fringes of wetlands<sup>[7]</sup>.



Fig-1: Yellow-wattled Lapwing

A critical perusal of the available literature reveals that Yellow-wattled Lapwing has been reported as a non-common resident<sup>[2]</sup> very rare<sup>[8]</sup> and rare bird in Punjab<sup>[9, 10, 11]</sup>. It was recorded for the first time on April 10, 1910 by the British-India Police Officer H. Whistler who shot a pair of these birds in the riverine area of the river Satluj near Phillaur and stated it to be a very rare bird<sup>[8]</sup>.

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Further, there is no mention of Yellow-wattled Lapwing in different studies [12, 13, 14, 15] undertaken by respective workers on avifauna dwelling in different parts of Punjab. The species is not listed in the first ever checklist of birds of Punjab and Chandigarh [16]. While commenting upon its rare occurrence in Punjab and Haryana, Dhindsa [9] stated that he had not seen this bird anywhere in Punjab during a period of almost six years (1976-1983) when he visited almost the whole Punjab for study of bird life. After its first record by Whistler on April 10, 1910 there has been no record of Yellow-wattled lapwing from any part of Punjab till 1983 [10]. Subsequently, one bird was seen in Sirhind, district Patiala in 1984 and another shot at village Wadala, district Jalandhar on 28 January 1986 [11]. Moreso, the Yellow-wattled Lapwing finds no reference in the recent studies [17, 18, 19, 20, 21] conducted during the last decade on the avifauna of Punjab. Except for these scattered sightings, as such there exists no well-defined record of a particular nesting cum foraging ground of this bird from the State of Punjab. Further, the breeding biology of its more common congeneric cousin, Red-wattled Lapwing has been studied in sufficient details [22, 23, 24, 25, 26]. Some aspects of the breeding biology of the Yellow-wattled Lapwing have been studied from southern India [27, 28, 29, 30, 31] and Haridwar [32]. Present study is an attempt to explore both these hitherto unattended aspects from the state of Punjab.

## 2. Methodology

The study period extended from January 2014 to December 2014 which included the peak breeding season of the Yellow-wattled Lapwing.



**Fig-2 A - Nesting Ground B - King's Castle Resort C - Delhi-Ludhiana National Highway**

The breeding cum foraging site of the Yellow-wattled Lapwing recorded during the present study is located (latitude: 30; 43; 52.60 N & longitude: 76; 09; 54.59 E) on the right side of the Delhi-Lahore National Highway about 2 Km past Khanna city opposite to Mohanpur village in Ludhiana district. After the first sighting of the Yellow-wattled individuals in February 2014, the habitat has been regularly monitored for the next ten months till December 2014. The observations on feeding, nest building, incubation, presence of predators etc. were made from the field boundaries or vantage points using Olympus 10X50 DP-I Field 6.5 Binoculars. The GPS data and photographs were taken using Sony SLT-A77V Camera fitted with 70—300mm Tamron tele-lens. Video clips were also been made for understanding of the behavioral aspects. The hourly field visits in the morning, noon and evening time were taken every 2-3 days and the ground nests were located by noting the typical, indicative behaviour of the Lapwings, their activity area, nest building, sitting behaviour and the alarm calls. The locations of the nests were marked by placing half-

brick pieces at a distance of about 3m from the nest. The eggs were counted and the dimensions were measured using a Vernier Calliper. The contents of the nests were examined during the cool hours of morning and evening and an effort was made to stay near the nest for a minimum period of time so that the incubation is not effected at all. The information about the breeding site was also collected from the locals. The observations were immediately recorded in the field diary.

## 3. Observations and Discussion

Yellow-wattled Lapwing individuals were first observed on February 21, 2014 at 5:30pm in an uncultivated land (latitude: 30; 43; 52.60 N & longitude: 76; 09; 54.59 E) on the right side of the Delhi-Ludhiana National Highway past Khanna city, opposite village Mohanpur. This land of about 10-11 acres is located adjacent to the King's Castle Marriage Palace. During the next week the repeated field visits in the site confirmed that it was not an incidental sighting of this bird rather the four individuals of this species were permanently staying there.



**Fig-3: Nesting cum Foraging Ground**

This land area was initially a part of the adjoining agricultural fields and was lying uncultivated for the past more than one decade. A small pond was observed at one corner of this habitat. There were some totally bare patches, some scattered *Calotropis procera* plants, scattered and sparse growth of Congress grass and most of the area was covered with low grass. In the entire habitat the shrubs and trees were totally wanting. Only along the Highway side, the habitat was bordered by some bushes, Eucalyptus, Acacia and Sheesham trees. Some temporary water pools were formed in the habitat during the rains.

It was observed that the Yellow-wattled Lapwings never leave this nesting cum foraging site and generally remain silent. Unlike Red-wattled Lapwing, the Yellow-wattled Lapwing is non-obtrusive and generally keeps a low stance.



**Fig-4: *Episyrphus balteatus***

It avoided the presence of Red-wattled Lapwing individuals near it and used to run away or flew whenever a Red-wattled Lapwing approached near it. On approaching near them, they quickly walked away noiselessly and rarely resorted to flying. During the non-breeding months the individuals spent more time foraging in the peripheral parts of the habitat. In the first week of April 2014, it was observed 'preferably feeding' on *Episyrphus balteatus*, a relatively small (9-12 mm) and common hoverfly belonging to Syrphidae family of the insect order Diptera. These hoverflies visiting the Congress grass were preyed upon by the Yellow-wattled Lapwing at rate of 12-14 hoverflies per minute (April 04, 2014 at 9:34 am). In case of some birds, the females increase in the intake of insects and other protein-rich food components during the egg laying period [33]. Many a times these Lapwings were seen picking up minute stones from the roadside in the evening. They were seen foraging in pairs, a pair foraging in one part of the habitat.



Fig-5: Nest and Egg Clutch

The nesting season extends from April to July [5, 34]. On April 04, 2014 (morning 9:30 am) the Yellow-wattled Lapwings were seen sitting in the nests. Two nests located at a distance of 20m in the interior part of the habitat were observed. Both the nests were shallow circular depressions/scrapes with a diameter of about 12 cm and were made in the low green grass. One of these was lined with dried grass, twigs and some dried dung pieces. The second nest was made near a *Calotropis* plant and contained dried wood pieces, some half-burnt ashy leaves and some dried dung pieces. Dried dung pieces have also been seen in the subsequently made nests. The other materials such as some gravel pieces and twigs [27] and tiny *kunkurs* [34] in the nest of Yellow-wattled Lapwing has been reported in respective studies. The dried dung pieces and gravel are present in the nests of Red-wattled Lapwing also [23]. This sort of foundation is useful during the rains and prevents sinking of eggs into wet earth [35]. The distance between the active nests and large trees along the Highway side of the habitat was more than 100m and hence the nests were distantly located from the perching sites of the predators. During the present study no territorial conflict was seen between the two pairs inhabiting the same nesting ground with nests at a distance of about 20 m.

There were four eggs in one nest and three eggs in the other. The eggs were laid during night or early morning hours well before the sun rise. They were pyriform in shape being broader at one end and pointed at the other. The ground colour of the egg shell was non-glossy pale green blotched with irregular dark brown spots and lines. As such, they were completely camouflaged with their surroundings. However, the ground

colour of the eggs turned darker within two weeks of incubation. The average egg size was measured as 3.5 cm x 2.7 cm. Jayakar and Spurway [27] measured two eggs of Yellow-wattled Lapwing as average size of 3.7 cm x 2.6 cm and earlier Whistler [34] reported it as 3.6 cm x 2.7 cm. During the egg laying week, the Lapwings were seen performing the displacement brooding. While doing so the lapwing sits at a place away from its nest adopting the incubation posture.



Fig-6: Yellow-wattled Lapwing in displacement brooding

During the breeding season extending from April 2014 to July 2014, the two couples laid a total of four clutches each consisting of four eggs. Out of the two clutches initially observed on April 10, 2014 morning, one was completely lost during the first week and in the second only two eggs lasted till May 09, 2014, the day when one of them successfully hatched at about 3:00 pm. The second one did not hatch till 7:00 pm and was observed for asynchronous hatching [29] which may take place for 20-43 hours [26]. However, both this un-hatched egg and the chick were lost by the next morning. In both the cases, no trace of the broken eggs was seen and the exact cause of the loss of the eggs and the young one could not be ascertained. After the loss of these two clutches, both the couples laid one more clutch each in the newly made nests. The author protected these clutches with some brick/stone shelter and this proved helpful in preventing the trampling of the eggs by the animals of the *Gujjar* community settled in one corner of the habitat. Out of these two clutches, seven eggs successfully hatched into young ones giving a total hatching success of 50%.



Fig-7: Incubation of the Eggs

Highlighting various threats to the nests of Yellow-wattled Lapwing Sethi *et al.* [32] observed a low hatching success of 27.58% in Yellow-wattled Lapwing nests.

In the present study the incubation period was observed to be 29 days from the completion of the clutch. This is in conformity with an incubation period of 27-30 days observed in the study [32] from southern India. The incubating birds showed changes in their behavior response to disturbances near the nest. During the first week of incubation, the Yellow-wattled Lapwing sat on its eggs for short periods and was seen foraging near the nest. When approached, the incubating lapwing gently left the nest without producing any alarm calls. It walked away about 1m from the eggs and showed displacement feeding. In this behavior the lapwing performs a downward pecking movement as in normal feeding but it does not pick up any insect, stone or other particle. In Red-wattled Lapwing, *Vanellus indicus* displacement feeding is performed when an actual escape route is blocked [23]. As the incubation advanced, the incubating lapwings spent most of the time sitting on eggs except for the relatively cooler morning and evening hours when they were seen foraging near the nests. Undoubtedly, with the advancement in incubation period, the value of the clutch increases for the parents and the incubating birds become more reluctant to leave the nests unattended [36]. Lateral tossing was observed during the third week of incubation. The incubating lapwing quickly moved 8-9 steps away from the nest and performed lateral tossing of the small pebbles by quick jerky lateral movements of the head.



Fig-8: Lateral tossing as a displacement activity

This sort of activity is a nest building and displacement activity in Yellow-wattled Lapwing [27]. Both the parents were seen incubating the eggs during the fourth week of the incubation. During those scorching noons, when one of the parents was sitting on the eggs, the other was standing under the shade of a *Calotropis* plant at a distance of about 10-12 feet away from the nest. Both the parents kept their beaks open and continuously fluttered their gular regions. The gular fluttering helps in cooling the incubating bird [27]. The incubating bird also fluffed up its dark cap feathers. During the fourth week, when alarmed, the incubating lapwings produced sharp *whit-whit-whit* besides the plaintive *tchee-it*. In the course of incubation period of 29 days (April 11, 2014 to May 09, 2014) the incubating birds witnessed the maximum temperature ranging from 29 °C on April 14, 2014 to 43 °C on May 01, 2014 and minimum temperature ranging from 16 °C on April 11, 2014 to 25 °C on May 09, 2014. Though there existed a small pond at one corner of the nesting ground, no wing-wetting was observed during the present study.

The newly hatched chicks of Yellow-wattled Lapwing were nidifugous. They were hatched with eyes open and 3-4 hours after hatching were seen walking at a distance from the nest with one of the parents. The brownish-black downs of the nidifugous chick make them blended in with the surroundings and as such they were highly obliterated in the natural environment. They actively responded to the alarming calls of the parents and used to crouch in the low grass immediately. Both the parents were seen defending the nest and the young one very aggressively against any intrusion by humans and other birds. Making frantic calls they dived at the invaders and tried to chase away them out of the territory. In fact, on the day of hatching the parents were seen closely monitoring each and every activity not only in the territory but even at the distant edges of the territory.



Fig-9: A nidifugous chick of Yellow-wattled Lapwing

In the month of February 2014, when it was first spotted, there were a total of four individuals (two couples) in the nesting cum foraging site. After its breeding season, there was a flock of eleven individuals, including the independent juveniles in the nesting cum foraging ground in the second week of November 2014. Since the last week of December 2014 there were only six individuals in the area and the others might have migrated. As such the Yellow-wattled Lapwings are found in pairs or small parties [5, 7, 34, 37, 38].

During the months of November-December Red-wattled Lapwing were commonly seen in the wheat and potato fields adjacent to the nesting site of Yellow-wattled Lapwing. Contrarily, the Yellow-wattled Lapwings were never been seen in these fields or other crops. They remained confined to the main habitat with very low vegetation and some bare patches, rarely flying away from it. Amongst other factors, the height and penetrability of the vegetation rather than its dryness seems to be one of the main nesting site attributes influencing its selection by the Yellow-wattled Lapwing. In case of Sociable Lapwing, *Vanellus gregarius* the nest site selection is strongly influenced by the height of vegetation [38]. And in a study [40] on Northern Lapwing, the height of vegetation and its penetrability has been linked to the abundance of food, its accessibility and predation risk. As in the case of Northern Lapwing, the present observations indicate that the Yellow-wattled Lapwing too demonstrates an inherent preference for shorter vegetation with bare patches which facilitates an easier detection of food. The areas of damp soil are especially key to Lapwings later in the breeding season when aquatic invertebrates become an increasingly important part of their diet [40]. The presence of small temporary water pools formed during the rainy season in the

nesting-foraging site had no influence on the activity and behavior of the Yellow-wattled Lapwings.

Till date there has been no study on the range of threats being faced by the Lapwings in the state of Punjab. However, in the neighbouring state of Haryana agricultural intensification and urbanization has been considered to be a major cause responsible for decline of Yellow-wattled and Red-wattled Lapwings [38, 41].



Fig-10: Human interference and habitat deterioration

Agricultural intensification affecting the availability and suitability of the breeding and foraging habitats has been shown to be the main cause responsible for the decline of farmland bird communities [42, 43, 44]. In this context, the anthropogenic factors such as the destruction of natural habitats, intensive agriculture, growing industrialization and urbanization are creating serious problems for the avifauna dwelling in the State of Punjab.

The Yellow-wattled Lapwings inhabiting the presently reported nesting cum foraging ground are facing a variety of threats. It was observed during the field visits that the house crow and stray dogs were chased and driven out of the breeding site by the Lapwing individuals. The impact of House Crow, eagles, Kites and Greater Coucal as predators on the nests of Lapwings is well documented [45].



Fig-11: Dumping of waste..... an invitation to predators

The waste food/disposable plates dumped by the adjoining Kings' Castle Resort litter the nesting/foraging ground of Yellow-wattled Lapwing and attract house crows and dogs and hence further enhance the threat and disturbance by these predators. During the breeding season of Yellow-wattled Lapwing, the nomadic *Gujjar* community occupied one corner of this breeding site for their own stay and used to keep their domestic livestock herd there at night. This herd consisting of

about 30 animals trespassed the habitat twice a day while visiting the pond in the morning and evening. This nesting cum foraging ground of the rare bird is a private land and may be utilized for some commercial or agricultural purposes in the near future. It is hoped that the information and observations recorded during the present study will improve our understanding about distribution, habitat attributes, feeding and breeding behavior of Yellow-wattled Lapwing from the state of Punjab, and may prove useful for devising conservation and management initiatives for this rare bird in the state of Punjab.

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