

COURTSHIP BEHAVIOR OF ORANGE-HEADED THRUSH (*GEOKICHLA CITRINA*)

Tania Akhter^{1*}, Dipta Kumar Das², Imrul Hassan³ and Md. Rifat Hasan⁴

Isabela Foundation, Dhanmondi 6/A, Dhaka-3200, Bangladesh

Courtship displays are crucial for bird's mate attraction and reproductive success (Ali & Ripley 1980). Males primarily exhibit these behaviors, sometimes involving interactions with females (Huxley 1914; Bastock 1967; Ota et al. 2015; Soma & Iwama 2017). These displays reflect male quality, aiding in reproductive success (Mitoyen et al. 2019), showcasing eye-catching dances, acoustic calls, and use behavioral elements for potential mate (Ali & Ripley 1983; Houck & Reagan 1990). The Orange-headed thrush (*Geokichla citrina*), belonging to the family Turdidae, is a terrestrial bird distributed across various parts of Asia (Collar 2005). In Bangladesh, this species is categorized as a common resident (Khan 2018). Breeding seasons for the Orange-headed thrush are documented from February to June (Rasmussen & Anderton 2005; Grimmett et al. 2011; Sashikumar 2011; Singal 2019). However, information in terms of its breeding display is insufficient. This study presents three observations of the Orange-headed thrush's courtship behavior, focusing on female responses and shedding light on its breeding strategies in Ornithology.

During bird surveys at Satchari National Park (SNP) (24°07'12"N 91°27'03"E), Jahangirnagar University (JU) (23°31'57"N 90°10'05"E), and National Botanical Garden (NBG) (23°49'02"N 90°20'55"E) in Bangladesh, we observed the courtship behavior of *Geokichla citrina* opportunistically through direct observation from March 2021 to April 2024. The observed habitats were semi-evergreen where dominant trees are *Artocarpus chama*, *Dipterocarpus turbinatus*, *Schimma wallichii*, *Aporosa dioica*, *Dillenia pentagyna* and understory plants including *Triumfetta rhomboidea*, *Clerodendron viscosum*, a variety of fern and epiphytes (*Bambusa spp.*, *Alsophila sp.*). We captured photos and videos of courtship displays using handheld cameras (Nikon D7200, Canon 700D, Sony A7iii) and recorded the weather (sunny, cloudy or rainy), temperature and humidity, using a weather meter. The tree parameters for branch size that used by the species for courtship displays were recorded as follows: small (perching fully), medium (perching half), and large (perching less than half).

¹Author for correspondence: <taniaakhtar733@gmail.com>; ²Department of Zoology, Jahangirnagar University, Savar, Dhaka-1342, Bangladesh; ³Rajarbag Service Station. Rajarbag, Dhaka-1217, Bangladesh; ⁴Department of Zoology, National University, Dhaka, Bangladesh
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On 2nd March 2021 at SNP (24°07'33"N 91°26'28"E, covering an area of 2.43km²), we observed an apparent courtship display of a male *Geokichla citrina* near a stream on a shiny day (07:22h). During the display behavior the temperature was 28°C and humidity was 73%. The male positioned itself on a medium branch of a Mango tree (*Mangifera indica*), and the tree was covered by mature leaves with a canopy height: 7m, DBH: 56cm. The male perched on a medium branch 5.5m above the ground, showed a charismatic body movement by bowing its head down with tail and wings; spreading its wings approximately 20 cm from its body. The male continuously moved its neck in an up-right-down and up-left-down direction until departure from the spot. A song made by the male with different pattern of sounds that continued with body movements (Video S1: <https://doi.org/10.6084/m9.figshare.25722795>). Concurrently, an adult female was observed on a nearby medium branch. The female silently observed the display of the male. The female changed its perch once, then the male followed her, settling on a nearby large branch. Following that, the male began the display behavior once more and continued it until the female departed from the spot at 07:46h (Fig.1A). Regarding departure, the female flew away from the tree first. While the male had followed his partner's movements during the display, he did not follow her direction upon leaving, suggesting a possible rejection by the female.

On 23rd March 2024 at JU (23°52'23"N 90°16'04"E, covering an area of 2.8km²), near a trail, we encountered another courtship display by *Geokichla citrina* where the temperature was 30°C and humidity was 45% on a shiny day (10:27h). An adult male and female were seen to perch a large branch of an Akashmoni (*Acacia auriculiformis*) tree. The tree was full of with dry fruits with a canopy height: 8m, DBH: 82cm. Both sexes perched on medium to large open branches above (7m) the ground making a distance between them approximately 0.5m to 1.0m. The performance of courtship display by the male and female were similar to our first observation (Video S2: <https://doi.org/10.6084/m9.figshare.25723047>). The male positioned itself at the apex of a large dead branch and displayed its courtship song while continuously moving its neck and head (Fig. 1B). However, the female showed no interest in the male's displays and left first, followed by the male (10:31h). Their similar flight path indicates that the male might try to perform courtship behavior again in a different location to impress her.

On 1st April 2024 at NBG (23°48'53"N 90°20'52"E, covering an area of 0.84km²), we recorded another courtship display by *Geokichla citrina* as a third sighting. An adult male was observed first on a shiny day (09:56h) (where the temperature was 35°C, humidity 37% and the wind was blowing) to perform its display with song (explained in first observation) by perching a medium branch

of a Chandan (*Abrus precatorius*) tree above 6.0m the ground. The tree was full of with dry fruits with a canopy height: 9m, DBH: 50cm. After 4 minutes of display, a female flew away from a nearby area and perched on the same branch of the male. Initially, the female maintained a distance of 1.5m from the male without any response. Then, after passing 3 minutes, the female started to response by placing itself in front of the male. The male was dancing and singing from the same spot and the performance was also similar to our other two sightings except a long-time performance from a spot, but for female it was different. At that moment, the female responded by positioning its wings downward and neck upward. The neck movement was slow and continuous. Gradually, the female came close to the male with an approximate distance of 0.30m by showing these responsive courtship display (Fig. 1C) (Video S3: <https://doi.org/10.6084/m9.figshare.25712772>). This behavior for both sexes continued for about 7 minutes, with irregular calls produced by female that resembling as "chew chew". The courtship displays concluded, while both sexes flew away together from the tree (10:10h). It appears that the female preferred the courtship display of the male compared to our other sightings.



Fig. 1: Courtship display by Orange-headed Thrush (A) and (B) the male displayed its dance by bowing its head and was singing a song in front of the female but no response made by female. (C) the female responded by raising its neck, down its wings in backside and came close to the male.

Our observations of the courtship behavior in *Geokichla citrina* indicate that males use a well-defined series of vocalizations, postures, and head movements to attract females. This behavior is akin to the courtship strategies observed in various bird species (Lehrman & Friedman 1969). The study represents female responses also in front of male displays that are characterized by specific displays such as raising their necks, tails, and heads. The behavior suggests a potential acceptance or rejection of male by female (Lehrman & Friedman 1969; Beach 1975). This courtship ritual aligns with the principles of sexual selection, where females select mates based on various factors like territory quality, resource access, and genetic fitness (Andersson 1994). However, our observations suggest a potential female response related to variations in weather and tree parameters across all sites, with wind speed being notably higher in the last observation compared to the others. Furthermore, in the last observation, the male's efforts were distinctly different, as he spent a longer duration displaying from a branch compared to earlier observations, continuing until the female responded. Similar studies on other bird species have shown that certain features of courtship, like display intensity and duration, can influence female preferences and mating decisions (Seymour & Sozou 2009). Further research into the courtship dynamics of *Geokichla citrina* could shed more light on the intricate mechanisms of mate choice and reproductive success in this species.

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