

Vocal mimicry of the White-throated Kingfisher by the House Crow in an urban habitat in Pune, Maharashtra



A House Crow
Corvus splendens
in an urban habitat
at the Darda Girls'
Hostel area, Pune,
Maharashtra, India.
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Crows belonging to the genus *Corvus* are among the most widespread and behaviorally complex birds in the family Corvidae. Members of this family occur across diverse habitats, including forests, agricultural landscapes, urban environments, and coastal ecosystems, and are well known for advanced cognitive abilities, complex social structures, problem-solving skills, and flexible behavioural strategies (Emery & Clayton 2004; Marzluff & Angell 2005).

Vocal communication plays an important role in corvid social organization, with calls used in alarm signalling, territorial defence, mate communication, and group coordination.

Research on Jungle Crows has demonstrated individual recognition through vocal signatures and adjustment of calls according to social context (Kondo et al. 2010). In Jungle and Carrion Crows, differences in vocalizations have also been associated with vocal organ morphology and acoustic structure, indicating that both anatomical and behavioural factors influence sound production (Tsukahara et al. 2007).

Vocal learning and mimicry are among the notable features of corvid vocal behaviour. Vocal mimicry involves the production of sounds resembling those of other species or environmental sources. Although vocal

learning is particularly well documented in parrots and some songbirds (Bradbury & Balsby 2016), complex vocal production also requires precise motor control of the vocal apparatus (Goller & Cooper 2004). Vocal mimicry has now been documented in several members of the Corvidae. Wascher et al. (2025) found evidence of vocal mimicry in 39 of 128 corvid species (30%), involving calls of raptors, owls, gulls, songbirds, cuckoos, mammals, amphibians, insects, humans, and anthropogenic sounds.

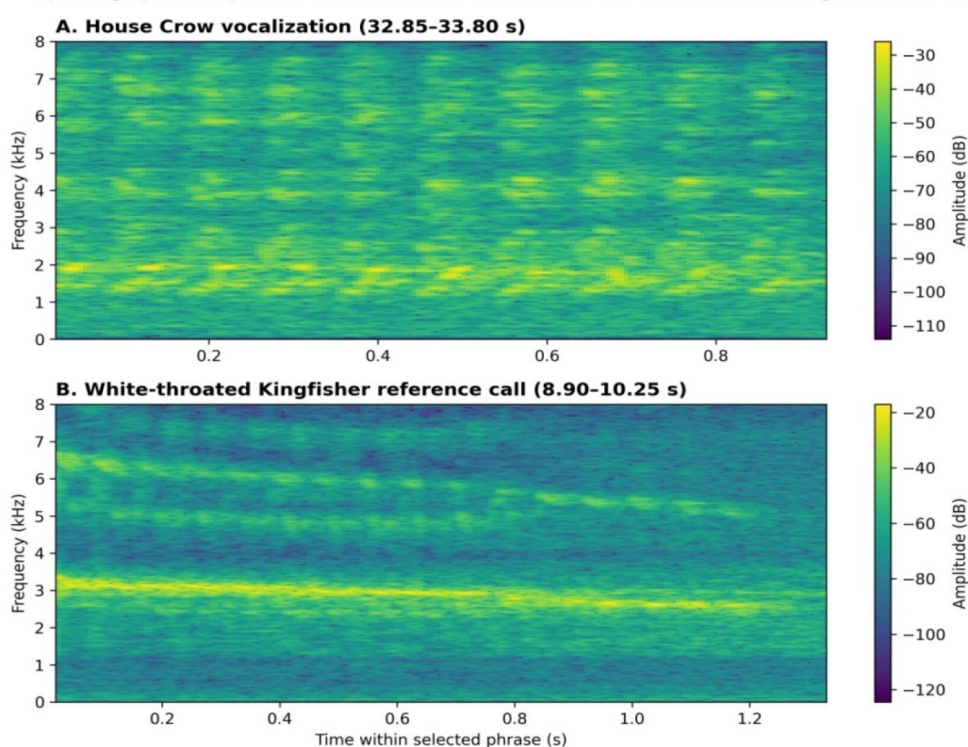
The ecological and behavioural significance of such mimicry remains uncertain and may involve interspecific communication, social interactions, deterrence, or vocal learning as a by-product of advanced vocal flexibility (Emery & Clayton 2004). Vocal production learning can also involve convergence toward or divergence from auditory models depending on social and environmental conditions (Vernes et al. 2021).

Despite increasing interest in corvid vocal behaviour, detailed field documentation of natural vocal mimicry remains limited. The present note documents a long-term, individual-specific vocal variant in a House Crow *Corvus splendens* that closely resembles the vocalization of the White-throated Kingfisher *Halcyon smyrnensis* in an urban locality of Pune, Maharashtra, India. The observation is supported by a complete field recording and spectrographic comparison with a White-throated Kingfisher reference recording.

Audio recording and acoustic analysis

The vocalization of the House Crow was recorded at an approximate distance of 7.6 m (25 ft) using a Samsung Galaxy On7 Prime smartphone in M4A/AAC format. At the time of recording, the crow was perched on an electric wire. For acoustic comparison, a reference recording of the White-throated Kingfisher was

Spectrographic comparison of the submitted House Crow and White-throated Kingfisher recordings



Spectrographic comparison of vocalizations: A—House Crow (*Corvus splendens*) vocalization from the submitted field recording | B—White-throated Kingfisher *Halcyon smyrnensis* reference vocalization.

obtained independently at the same locality on 17 August 2026 using the same equipment and saved in MPEG file format. Original audio files were retained for subsequent bioacoustic analysis. For additional comparison, an independently archived White-throated Kingfisher recording from India (Scharringa 2021) was also consulted. The recordings were examined using Python 3 with the SciPy, NumPy, and Matplotlib libraries. Spectrograms were generated using a Hann window with a 2048-point FFT and 1792 samples of overlap between successive windows. For visual comparison, the frequency range of the spectrograms was restricted to 0–8 kHz and spectral amplitude was displayed on a decibel scale.

For the preliminary acoustic comparison, representative vocal phrases were selected from both recordings. The selected House Crow phrase occurred at approximately 32.85–33.80 s, while the selected White-throated Kingfisher phrase occurred at approximately 8.90–10.25 s. Phrase duration was measured from the beginning to the end of each selected vocal phrase. Spectral measurements included the median spectral-peak frequency and median spectral centroid within the 1–8 kHz frequency range. The spectral peak represents the frequency with the highest spectral amplitude within the analyzed range and was not interpreted as the fundamental frequency.

The acoustic measurements were used for descriptive comparison only. As the recordings were obtained under different recording conditions, amplitude values were not treated

as calibrated sound pressure measurements. The same spectrogram settings and frequency scale were used for the two recordings to facilitate visual comparison of their temporal and spectral characteristics.

Observation

Field observations were conducted on 07 March 2026 at approximately 1000 h in the Darda Girls' Hostel area, Gultekdi Market Yard, Pune, Maharashtra, India (18°28'56.0"N, 73°52'03.2"E; ca. 608 m). The site is a densely populated urban locality containing trees, open spaces, buildings, electric wires, and human-associated food resources. During the observations, a House Crow was recorded producing a vocalization closely resembling that of the White-throated Kingfisher.

The individual had been known to the observer for a long time, and the vocalization described here had been repeatedly recognized as part of its normal vocal behaviour. The individual commonly attempted a typical House Crow vocalization but repeatedly returned to the same distinctive vocal form resembling the White-throated Kingfisher. The complete behavioural sequence, including these vocal attempts and repetitions, is retained in the submitted audio recording. Thus, the present record represents a persistent vocal characteristic of a known individual rather than an isolated unusual call.

Several House Crows were present and active in the locality, with multiple nesting sites occurring in nearby trees. However, during the observer's repeated encounters with the local crows, this

Descriptive acoustic measurements of representative vocal phrases.

Parameter	House Crow	White-throated Kingfisher
Recording origin	Field recording	Field recording
Selected phrase	32.85–33.80 s	8.90–10.25 s
Phrase duration	0.95 s	1.35 s
Median spectral-peak frequency	1.82 kHz	2.93 kHz
Median spectral centroid	3.44 kHz	3.21 kHz
Sampling rate	48 kHz	48 kHz

particular individual was consistently associated with the distinctive kingfisher-like vocalization. This observation describes an individual-specific vocal variant rather than a widespread behaviour among local House Crows.

The vocalization consisted of repeated harsh notes delivered in short phrases. In the field, its overall vocal quality and temporal pattern were sufficiently similar to the characteristic loud vocalization of the White-throated Kingfisher to allow recognition by the observer. Rasmussen & Anderton (2012) provide the principal regional field reference for *H. smyrnensis*, and independent reference recordings were also consulted for acoustic comparison. This comparison is based on the overall temporal and spectral structure of the calls, without assuming the two vocalizations are acoustically identical.

Bioacoustic comparison

The submitted House Crow recording was examined spectrographically and compared with the recorded White-throated Kingfisher reference recording. Time is shown on the x-axis and frequency on the y-axis (0–8 kHz). The spectrograms are presented for visual comparison of temporal and spectral structure. Recording amplitudes are not directly comparable between the two recordings. A

representative House Crow phrase occurring at approximately 32.85–33.80 s and a clear White-throated Kingfisher phrase occurring at approximately 8.90–10.25 s was selected for the initial descriptive comparison.

The selected House Crow phrase was approximately 0.95 s in duration, whereas the selected White-throated Kingfisher phrase was approximately 1.35 s. Within the 1–8 kHz analysis band, the median spectral-peak frequency was approximately 1.82 kHz for the Crow phrase and 2.93 kHz for the Kingfisher phrase. Median spectral centroid values were approximately 3.44 kHz and 3.21 kHz, respectively.

These measurements are presented as descriptive acoustic parameters rather than evidence that the two calls are acoustically identical. Because the recordings were made under different recording conditions and with different source recordings, amplitude should not be interpreted as directly comparable sound-pressure level. Similarly, the spectral peak is not interpreted here as the fundamental frequency.

Discussion

The observation contributes to the growing body of knowledge on vocal flexibility in corvids

by documenting a persistent, individual-specific vocal variant in a free-ranging House Crow. Unlike an isolated opportunistic recording, the vocalization described here was familiar to the observer over an extended period and was repeatedly produced as part of its normal vocal behaviour. The individual's repeated return to this distinctive vocal form after attempting a typical House Crow call is consistent with a stable individual vocal variant that may have been learned or established during development. However, because the acquisition process was not experimentally observed or manipulated, the present observation cannot establish the precise mechanism by which the vocalization was acquired.

The spectrographic comparison demonstrates that the House Crow and White-throated Kingfisher vocalizations share a broadly overlapping frequency range, while also showing differences in phrase duration and spectral peak frequency. The two calls should therefore not be described as acoustically identical. Rather, the acoustic data support the field observation that the Crow produces a vocalization resembling the White-throated Kingfisher, with similarity evident in the general temporal and spectral characteristics. This interpretation is consistent with the broader evidence that vocal mimicry is widespread but variable among corvids; Wascher et al. (2025) documented mimicry in 39 of 128 corvid species and emphasized that many cases may remain undetected.

The White-throated Kingfisher is a conspicuous and vocal species that commonly uses exposed



A House Crow
(*Corvus splendens*)
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perches in open and human-modified habitats (Rasmussen & Anderton 2012). The broader locality where the Crow was observed is suitable for regular occurrence of the species.

However, unless the presence of a White-throated Kingfisher was directly documented immediately before or during the recorded sequence, the present observation does not show that the crow necessarily acquired the vocalization through recent exposure to a nearby individual. Instead, repeated exposure to the species' vocalizations in the broader locality may be considered a possible source of the auditory model.

The original observation that other House Crows in the locality did not show the same vocalization should also be interpreted cautiously. Because the observations were not conducted as a standardized quantitative survey of all local crows, absence of the same vocalization in other individuals cannot be used to demonstrate that mimicry is absent from the local population. Nevertheless, the repeated association of this vocalization with the same known individual supports the interpretation

that it represents an individual-level vocal characteristic.

The functional significance of the vocalization remains uncertain. It may reflect exploratory vocal learning, individual behavioural innovation, social signalling, or incorporation of a frequently heard heterospecific vocalization into the individual's repertoire. The present observations do not provide evidence that the Crow was attempting to communicate directly with White-throated Kingfishers, nor do they demonstrate an adaptive function for the mimicry. Continued monitoring of this individual, together with recordings of its normal House Crow calls and kingfisher-like vocalizations, may help determine whether the vocal variant persists with age, changes with social context, or occurs in other individuals.

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Citation: Sayyed, A. & C. Shukla (2026). Vocal mimicry of the White-throated Kingfisher by the House Crow in an urban habitat in Pune, Maharashtra. *Bird-o-soar* #303, In: *Zoo's Print* 41(10): 23–28.