

Cuculidae: recognize Penan Hawk-Cuckoo (*Hierococcyx tiganada*) as a novel species distinct from closely related Dark Hawk-Cuckoo (*H. bocki*)

Taxonomic revisions on the basis of data presented in Rheindt et al.
2025

Context

The Bornean population of *Hierococcyx bocki* has been described as a new species to science, *H. tiganada*, based on its distinct vocalizations (Rheindt et al., 2025).

This proposal seeks to recognize 'Penan Hawk-Cuckoo' H. tiganada from Borneo as a distinct species from Dark Hawk-Cuckoo H. bocki, based on the following evidence:

Bioacoustics

H. tiganada has a three note song, while all other closely-related congeners (*H. bocki*, *H. varius* and *H. sparveriodes*) have a two note song (Figure 1). Importantly, playback experiments also demonstrate the lack of response from *H. tiganada* to *H. bocki* songs whereas they do respond to their own song (Table 1). Vocal parameters between *H. tiganada* and *H. bocki* are shown to be distinct on a PCA (Figure 2) and have two Isler diagnosable vocal parameters (number of elements per motif and average duration of motifs). The Isler criterion (Isler et al. 1998) is a stringent vocal diagnosability test that was originally developed for suboscines but has since been applied for passerines (Gwee et al., 2019) and non-passerines (Ng & Rheindt 2016). The Isler criterion is rigorous as it requires vocal parameters to not overlap and that the minimum and maximum vocal parameters had to remain different after adding penalties.

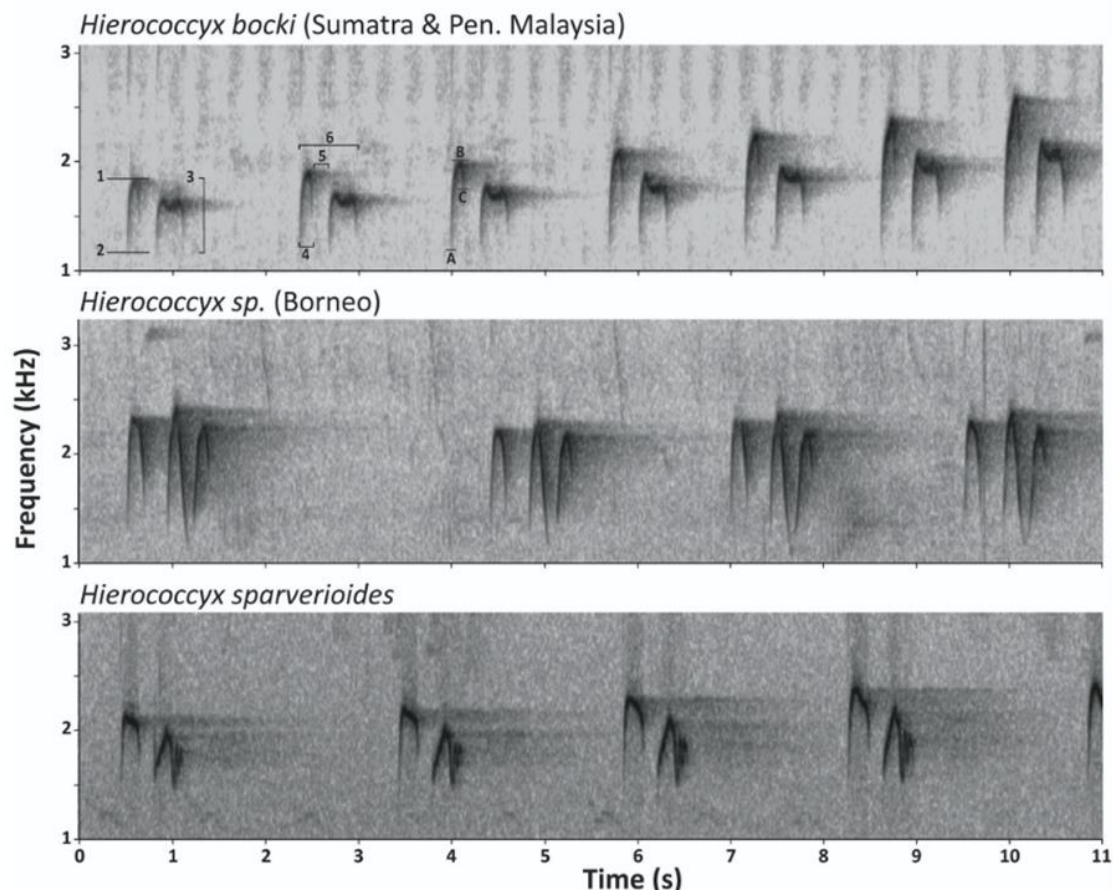


Figure 2. Spectrograms of 'brainfever' calls for three *Hierococcyx* taxa. Top: *H. bocki* (XC93021); centre: *H. sp.* (XC167243) from Borneo; bottom: *H. sparveriodes* (XC19749). Recording codes refer to registration numbers on www.xeno-canto.org. Parameters measured include (1) highest frequency, (2) lowest frequency, (3) bandwidth frequency, (4) duration of element, (5) inter-element duration, and (6) duration of motif. A, B, and C denote the starting frequency, highest frequency and end frequency, respectively, of an individual element (see Methods for explanation). For the purposes of homology, second and third elements in Bornean recordings were considered as a combined 'second' element (see Methods).

Figure 1. Sonogram of *H. sparveriodes*, *H. bocki*, and *H. tiganada* (represented as *H. sp.*)

Table 1. Results from playback experiments conducted in the field

Location of population tested	Song played					
	Peninsular Malaysia		Sumatra		Borneo	
	Strong response	No response	Strong response	No response	Strong response	No response
Peninsular Malaysia	15	8	14	2	0	13
Sumatra	4	1	4	7	0	2
Borneo	0	16	0	7	13	5

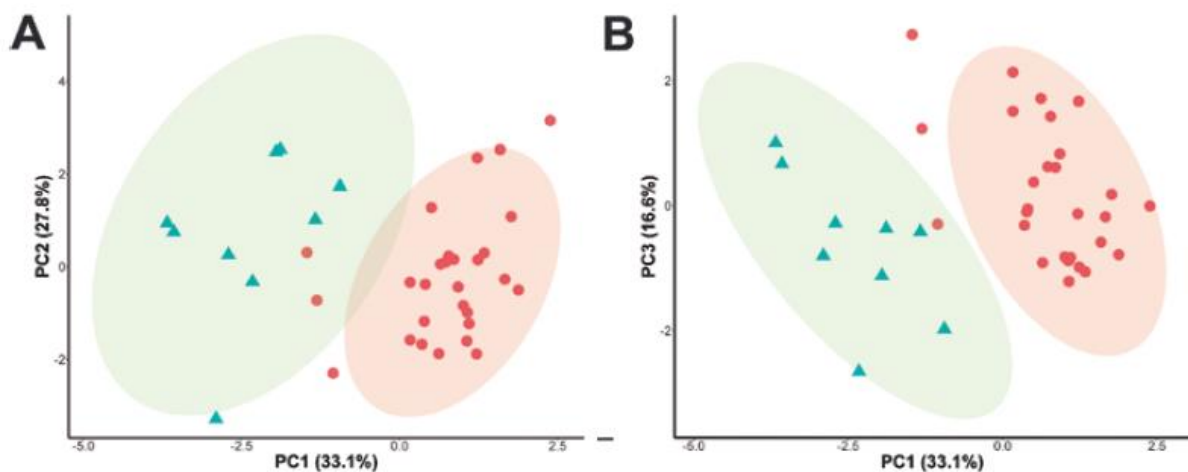


Figure 2. Principle component analysis of vocal parameters comparing *H. bocki*, (in green triangles) and *H. tiganada* (in red circles).

Habitat

Both species are non-migratory and have non-overlapping ranges.

H. bocki ranges in the montane forests of Sundaland (Peninsular Malaysia and Sumatra; van Marle & Voous 1988, Sheldon et al. 2001, Eaton et al. 2016).

H. tiganada resides in the same habitat as *H. bocki* but is only found on Borneo (Rheindt et al., 2025)

Morphology

(based on Payne, 2005)

Dark Hawk-cuckoo (*H. bocki*): 30-32cm. Cuckoo with an *Accipiter* hawk-like appearance, nearly black above, chin and throat ashy gray, breast rufous, lower breast and belly barred black and white, wings short and tail long and banded, the black bands as broad as the gray bands. Differs from Large Hawk-cuckoo *H. sparverioides* by darker plumage, dark face, small size, and song (*H. bocki*) sings in season of overlap; *H. sparverioides* is silent and when it does sing the song differs (Payne, 2000).



Figure 3. Dark Hawk-cuckoo from Fraser Hill, Peninsula Malaysia

Penan Hawk-cuckoo (*H. tiganada*): Closely resembles its sister species *H. bocki* from Sumatra and Peninsular Malaysia. The two species are almost identical visually, but adults (probably males in particular) of the new species have a slightly greyer mantle, especially the upper mantle towards the crown, leading to a distinct lack of contrast between a grey crown and more brownish back that is apparent in *H. bocki*.



Figure 4. Penan Hawk-cuckoo from Sabah

Comparisons between *H. sparverioides*, *H. bocki*, *H. tiganada* (sp.) specimens

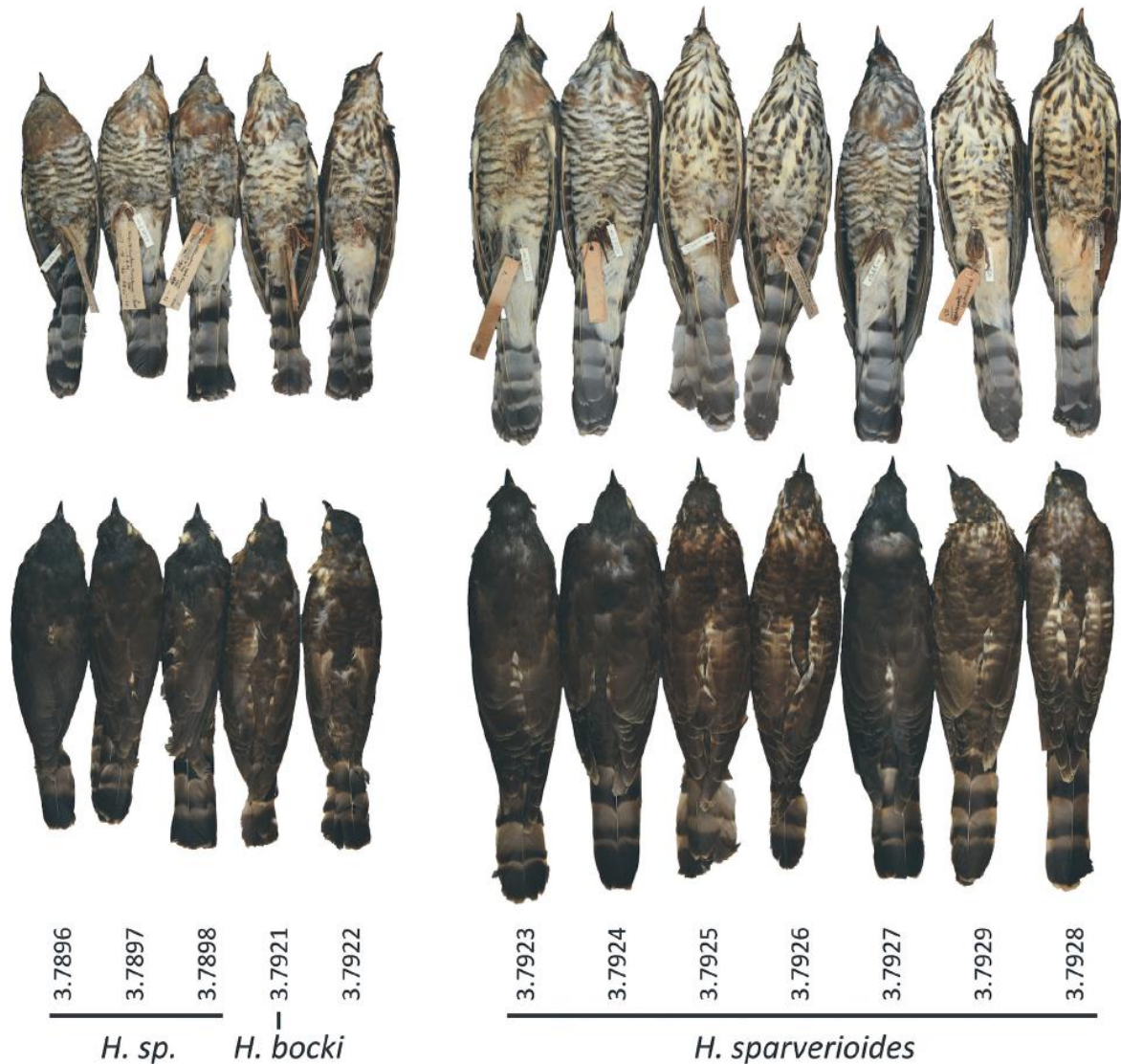


Figure 5. Ventral (top) and dorsal (bottom) views of the 12 specimens available at the Lee Kong Chian Natural History Museum in Singapore, with three *H. sp.* specimens from Mt Kinabalu, Sabah, on the left, followed by one *H. bocki* specimen from Sumatra, one ‘*H. bocki*’ from an unknown locality, and seven *H. sparverioides* on the right. Museum voucher numbers are indicated below the specimens. Specimen sequence is identical between panels. 3.7922 is also a *H. bocki* specimen.

Genetics

No genetic analyses have been conducted for *H. tiganada*.

Biogeography

H. bocki is resident on Malay Peninsula and Sumatra (Payne, 2005).

H. tiganada is resident on Borneo (Rheindt et al., 2025).

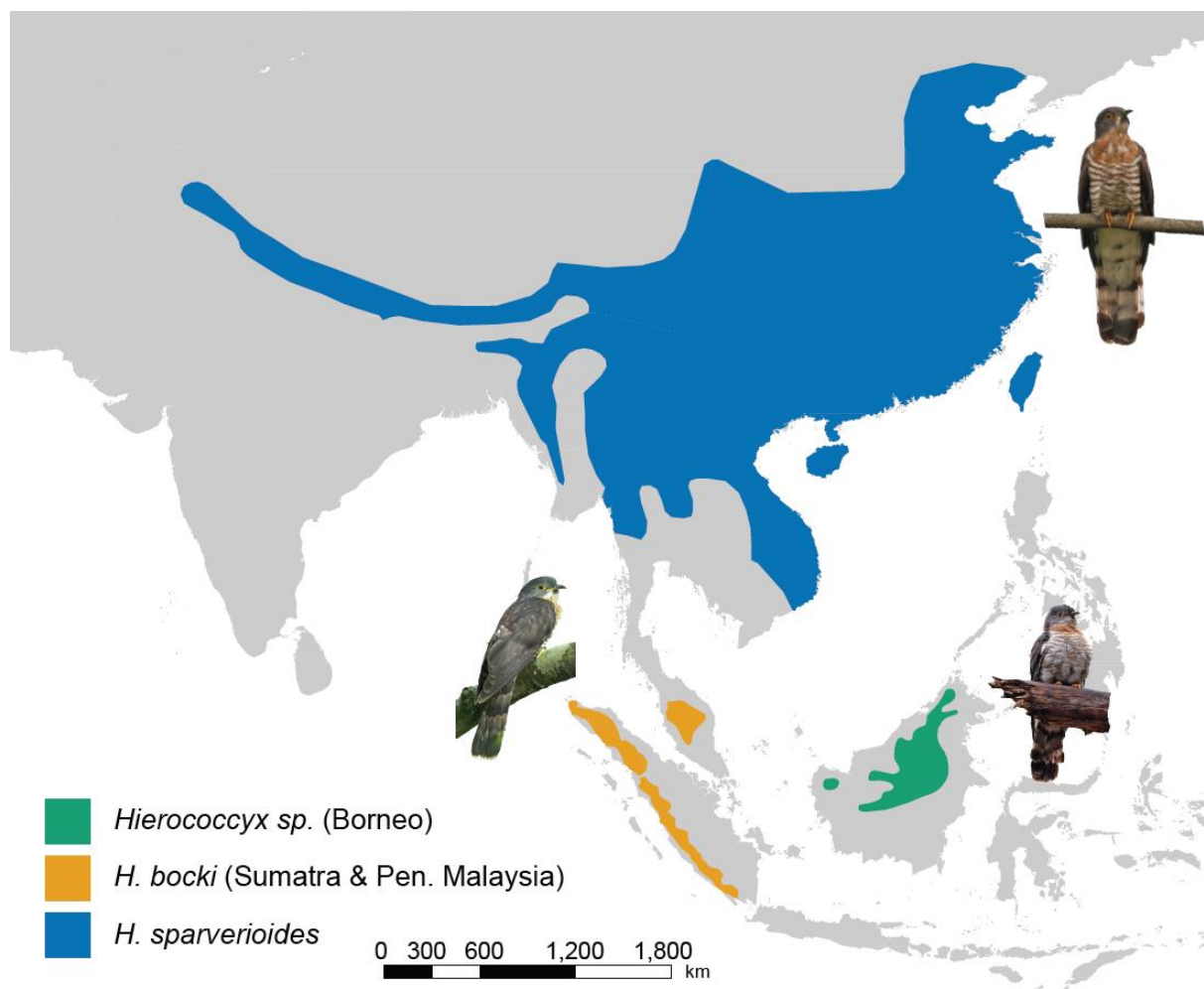


Figure 6. Breeding range of relevant species. *H. tiganada* is a non-migratory resident that breeds in Borneo whereas *H. bocki* breeds in the highlands of peninsula Malaysia and Sumatra.

Summary of *H. tiganada* vs *H. bocki*

- Genetics: No data
- Bioacoustics: No intermediacy in vocalisation with *H. bocki*. Different number of call notes (2 notes in *H. tiganada*, while *H. bocki* has 3 notes) and no response to playback of the other species
- Morphometrics: Very minor non-significant differences
- Plumage: Very minor, possibly only in adult males - like a subspecies
- Range: No range overlap in breeding range in the highlands of Borneo (*H. tiganada*) with closest taxa (*H. bocki*) in the highlands of Peninsular Malaysia and Sumatra.

Taxonomic history of *Hierococcyx* cuckoos

Within the hawk-cuckoos of the genus *Hierococcyx*, the relevant clade comprises of four closely related species (Figure 7): (1) Large Hawk-cuckoo *H. sparverioides* (Vigors, 1831), (2) Bock's Hawk-cuckoo or Dark Hawk-cuckoo *H. bocki* (Wardlaw-Ramsay, 1886), (3) Penan Hawk-cuckoo (Rheindt et al., 2025), and (4) Common Hawk-cuckoo *H. varius* (Vahl, 1797). The Penan Hawk-cuckoo was only recently split from *H. bocki* based on distinct vocalisation.

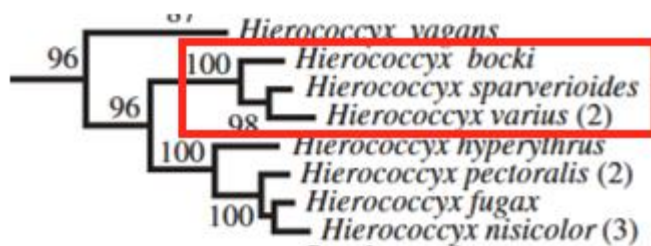


Figure 7. Phylogeny of *Hierococcyx* cuckoos based on mtDNA (Payne, 2005). Clade of interest highlighted in red.

Historically, species delimitation in *Hierococcyx* cuckoos, as in most other birds, has been guided by plumage differences (e.g., Shelley 1891). Since the 1990s, the taxonomy of many tropical and subtropical bird species complexes has undergone a revolution with increasing insights into the importance of bioacoustics characters for species delimitation (Jones 1997, Alström & Ranft 2003, Rheindt et al. 2008, Freeman & Montgomery 2017, Gwee et al. 2021). Species limits within numerous tropical and subtropical Asian bird species complexes have been re-drawn on the basis of bioacoustic evidence (e.g., Sangster & Rozendaal 2004, Ng & Rheindt 2016, Ng et al. 2016, Gwee et al. 2019), including cuckoos (Boseman & Collar, 2019). Notably, King (2002) states that "It would be highly unusual for conspecific cuckoos to have different songs." This is particularly relevant for *Hierococcyx* cuckoos, which are brood parasites and do not raise their own young, and therefore possess innate, rather than learned, songs.

Since 1891, the Common Hawk-cuckoo (*H. varius*) has consistently been recognised to be a separate species given the difference in size and plumage from the Large Hawk-cuckoo (*H. sparverioides*; Table 1). *H. bocki* was not universally recognised at the species level in the 20th century, although a majority of authors now consider it sufficiently distinct (but see Dickinson & Renssen 2013).

Table 2. Taxonomic treatment of the relevant clade

	Taxa			
	<i>varius</i>	<i>sparverioides</i>	<i>bocki</i>	<i>tigananda</i>
Salvadori (1874)	<i>H. fugax</i>			
Shelley (1891)	<i>H. varius</i>	<i>H. sparverioides</i>	<i>H. bocki</i>	
Sibley & Monroe (1990)	<i>C. varius</i>	<i>C. sparverioides</i>		
del Hoyo et. al (2014)	<i>H. varius</i>	<i>H. sparverioides</i>	<i>H. bocki</i>	
Christidis et al. (2018)	<i>H. varius</i>	<i>H. sparverioides</i>		
Clements et al. (2019)	<i>H. varius</i>	<i>H. sparverioides</i>	<i>H. bocki</i>	
Gill & Donsker (2019)	<i>H. varius</i>	<i>H. sparverioides</i>	<i>H. bocki</i>	

See Appendix for additional information regarding taxonomic revisions of closely related cuckoo species.

Conclusion

Tropical Asian RAG supports the data presented in Rheindt et al. 2025 which describes Penan Hawk Cuckoo *H. tiganada* from Borneo as a new species to science, primarily on the basis of the three-note song which distinguishes it from *H. bocki* (from Sumatra and Peninsular Malaysia) which has a two-note song. Additionally, the results of playback experiments conclusively prove that *H. tiganada* responds to its own calls but not those of Sumatran and Peninsular Malaysian individuals, and vice versa. As noted by King (2002) and of particular relevance to *Hierococcyx* cuckoos which possess innate songs, "It would be highly unusual for conspecific cuckoos to have different songs."

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Appendix

Other taxonomic revisions of closely related cuckoo species

Himalayan vs Oriental Cuckoo

Oriental Cuckoo and Himalayan Cuckoo were split based solely on bioacoustics (Xia et al 2016) and wing length (King 2005). King (2005) stated: "Morphologically, *horsfieldi* and *saturatus* differ only in size, with much overlap. However most (c.95%) accurately sexed adult specimens can be differentiated by wing length." In Xia et al. (2016), they found that note number per syllable was higher in Himalayan (4-6 notes) than Oriental (2-4 notes). Both species cannot be differentiated by plumage.

Cercococcyx lemaireae (Whistling Long-tailed Cuckoo) vs *C. mechowi* (Dusky Long-tailed Cuckoo)

This split was proposed solely on vocal differences (Boseman & Collar, 2019), but was argued against due to the gap in sampling in the intermediate region and intermediacy of vocalisation in Cameroon (previous discussion: [aviantaxonomy/Taxonomic-Proposals-v2025#1021](#)).

The proposed split between *Cercococcyx lemaireae* and *C. mechowi* is similar to the current proposal in that it is based on bioacoustic evidence rather than morphometrics or genetics. However, in *Cercococcyx*, the primary argument against splitting was the presence of a sampling gap in the intermediate region and evidence of vocal intermediacy. In contrast, the current proposed split between *H. tiganada* and *H. bocki* shows neither a gap in sampling nor evidence of intermediate vocalisations.

Asian Hawk cuckoos: *H. nisicolor*, *H. fugax*, *H. hyperythrus*, *H. pectoralis*

[Quoting from King (2002)]

H. hyperythrus and *H. pectoralis* are readily distinguished from *H. nisicolor* and *H. fugax* by their distinct songs.

H. hyperythrus is highly migratory form with much longer wings and tail, and a much more pointed wing than *H. nisicolor*, *H. fugax*, *H. pectoralis*. Thus, we have a clear case for treating *hyperythrus* and *pectoralis* as separate species.

While the song of *H. nisicolor* is identical to *H. fugax*, their adult plumages are quite distinct. *H. nisicolor* is migratory (at least some populations) with a longer more pointed wing, and a shorter, less robust bill, than *fugax*, which is resident. Thus adult *H. fugax* with its very different plumage and longer bill is the most distinct of the four forms here considered. It is

concluded that because the morphological differences between *fugax* and *nisicolor* are so pronounced, they are best treated as separate species in spite of the fact that their songs are identical.

Asian Hawk cuckoos: *H. sparveroides*, *H. varius*, *H. bocki*

Shelley 1891 was the first to recognise three separate species: *H. sparveroides*, *H. bocki* and *H. varius*.

H. sparveroides was separated based on its large size and plumage differences: Size larger; wing 8 inches, grey of head and chin separated by a broad white band which extends from the fore part of the eye to the throat.

H. bocki was separated based on its smaller size, wing 7.4 inches, head and throat grey, with the throat only slightly mottled with white.

H. bocki and *H. sparveroides* are also paraphyletic genetically (Figure 7).

H. varius was separate based on paler colour, crown and back uniform pale grey (wing 7.5 inches).

Bioacoustics

Common Hawk-cuckoo (*H. varius*) song differs from song of Large Hawk-cuckoo *H. sparveroides*, the first note dropping in pitch, the second note falling (not rising) and the end dropping in pitch (not vibrating around an average pitch).

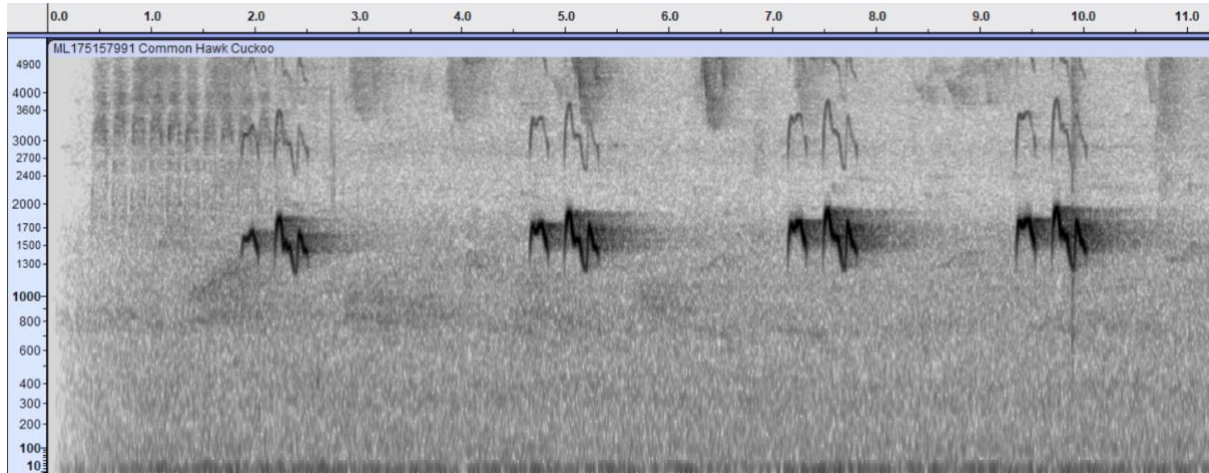


Figure 8. Sonogram of *H. varius*

Biogeography

H. varius breeds in Southern Asia from northern Pakistan, India, Bangladesh and Assam, and Sri Lanka (Payne, 2005).

H. sparveroides breeds on mainland Asia from Himalayas from N Pakistan and India to Nepal, Naga Hills, Manipur and Meghalaya, then east to China (Sichuan, N to lower Yellow R valley), Taiwan, and S to Myanmar, Thailand and Indochina (Payne & Kirwan, 2020). Winters mainly from NE India and Thailand S to S & E India, Peninsular Malaysia, Andaman Is., Greater and Lesser Sundas and Philippines (Payne & Kirwan, 2020). Only migratory species.

The breeding ranges of all four species are allopatric, with the two geographic overlaps occurring

1. The eastern end of the range of *H. sparveroides* and *H. varius*
2. Between the wintering range of *H. sparveroides*, *H. bocki*, and *H. tiganada*

Habitat

H. sparveroides is the more widespread taxon, breeding widely across montane tropical, subtropical and even temperate mainland Asia and wintering to the south (Rand & Fleming 1957, Vuilleumier 1993, King et al. 2001).

H. varius ranges in open wooded country, deciduous and semi-evergreen woodland, and pines, mangroves, gardens, orchards, irrigated forest plantations and tea plantations, in semi-arid plains and hill country across India and Sri Lanka (Payne, 2005).

Morphology

Common Hawk-cuckoo (*H. varius*): 33cm. Uniform gray above, sometimes with pale patch formed by inner secondaries, broad wings, and tail with bands, the gray bands broader than the black bands, throat whitish or gray not black, breast pale rufous and belly indistinctly barred. Adult is pale and lacks the dark streaks on throat and breast of Large Hawk-cuckoo *H. sparverioides*, juvenile has a pale chin not black as in Large Hawk-cuckoo and is spotted not barred on the belly, and has a pale bill.



Figure 9. Common Hawk-cuckoo from India

Large Hawk-cuckoo (*H. sparverioides*): 38-40cm. Large cuckoo with an *Accipiter* hawk-like appearance, gray head contrasts with brown back, wings short and tail long and banded, the black bands as broad as the gray bands. Differs from Common Hawk-cuckoo *H. varius* by the blackish chin and in subadult plumage the underparts more boldly streaked and barred; in winter from *H. bocki* by paler plumage, light face and large size.



Figure 10. Large Hawk-cuckoo from India