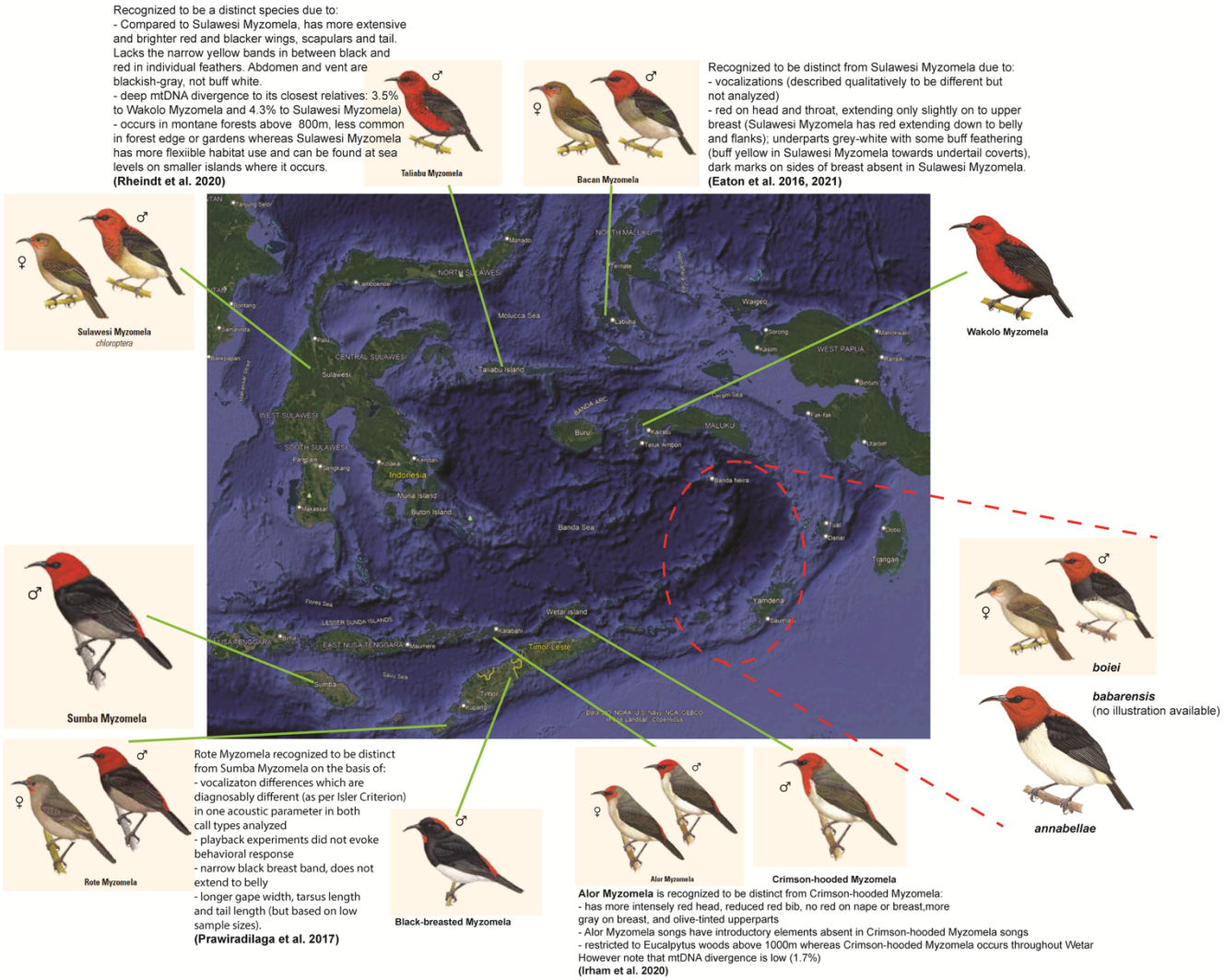
Meliphagidae: recognize *Myzomela babarensis* and *M. annabellae* as species distinct from *M. boiei*

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

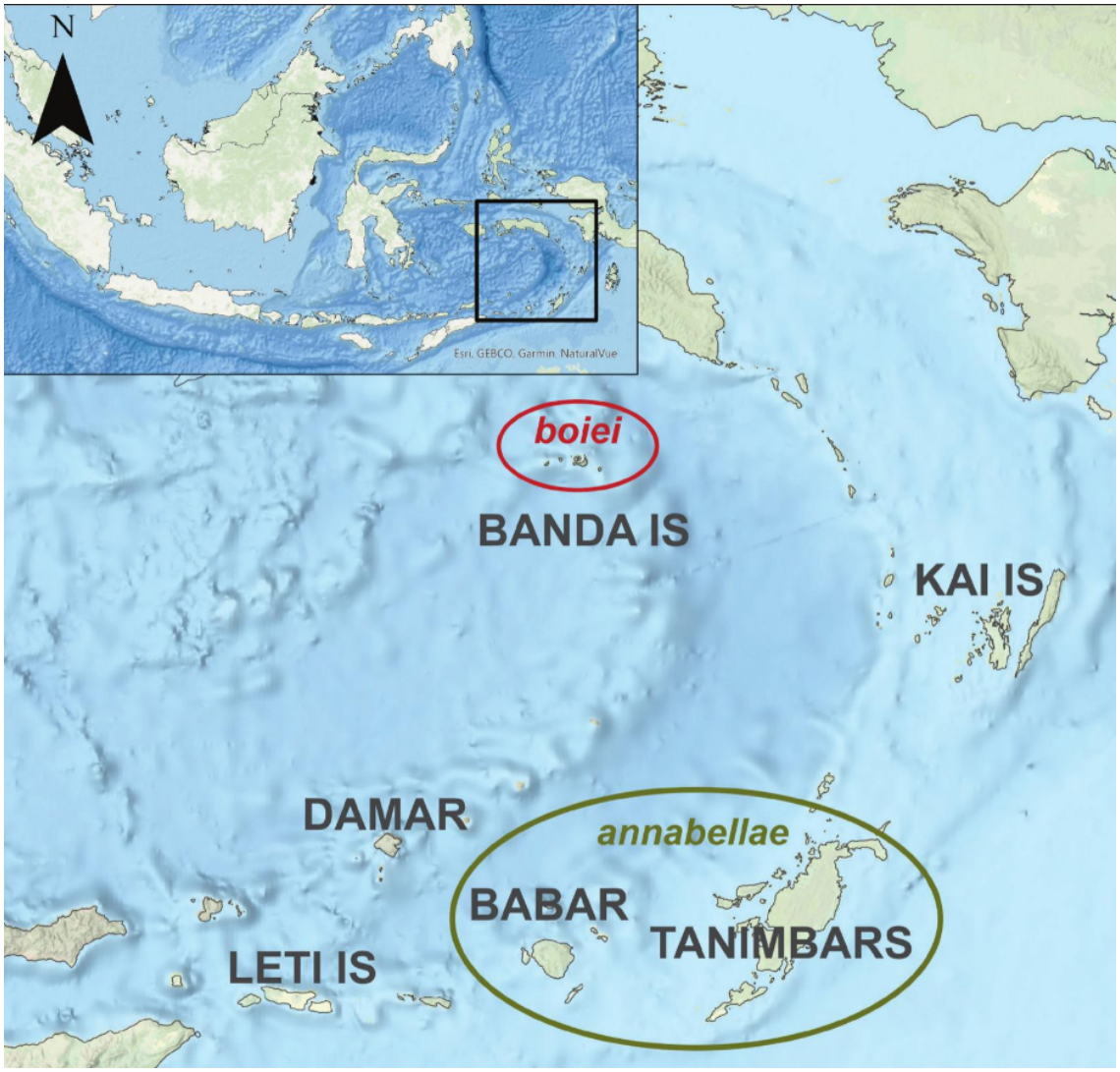
This proposal seeks the elevation of a current subspecies, *Myzomela boiei annabellae*, to species level. It also seeks the recognition of a new taxon to science, *M. babarensis*, at the species level.

Myzomelas are small honeyeaters that have undergone a massive radiation in the Wallacean region. In the last few years, three new species of *Myzomela* have been described from Wallacea (Irham et al. 2020, Prawiradilaga et al. 2017, Rheindt et al. 2020), and numerous more have been proposed for elevation to species level (e.g., Eaton et al. 2016). Genetic work on Wallacean myzomelas has been sparse, so most of these taxonomic changes have been on the basis of plumage differences. However, vocal differences have been key in some of the new proposals (e.g., Prawiradilaga et al. 2017).

The current proposal relates to a species complex that is found across three neighboring archipelagos (Tanimbar, Banda, and Babar), but has so far only been classified into two subspecies. It is argued that each of the three archipelagos deserves its own species-level lineage, necessitating the description of one new species.



Summary of Myzomela species recognized by AviList Phase 1 from the region, including brief descriptions of why certain taxa have recently been recognized as species (within the last ten years). The taxa tackled in this pre-proposal are within the red dashed line.



Summary of islands and taxa involved in this pre-proposal. Note that the new taxon to science, *babarensis*, is from Babar island (within the green oval encompassing *annabellae*).

Bioacoustics

Recordings of songs from the three taxa have been analysed, including six from Bandar islands, eight from Tanimbar Islands and seven from Babar island. Four parameters were quantified (number of notes in a strophe, strophe length, minimum and maximum frequency of entire strophe) and analysed using PCA.

The three taxa had such different vocalizations that they easily separated out on a PCA – sonograms show the diversity in song types between the three groups. *M. boiei* has a song type that is not documented from the other two taxa, and is so divergent that it is unlikely to be a dialect (Berryman et al. 2025).

Note that song differences have been used as evidence to recognize Bacan Myzomela as distinct from Sulawesi Myzomela (Eaton et al. 2016, 2021), Rote Myzomela from Sumba Myzomela (Prawiradilaga et al. 2017) and Alor Myzomela from Crimson-hooded Myzomela (Irham et al. 2020).

Figure 1:

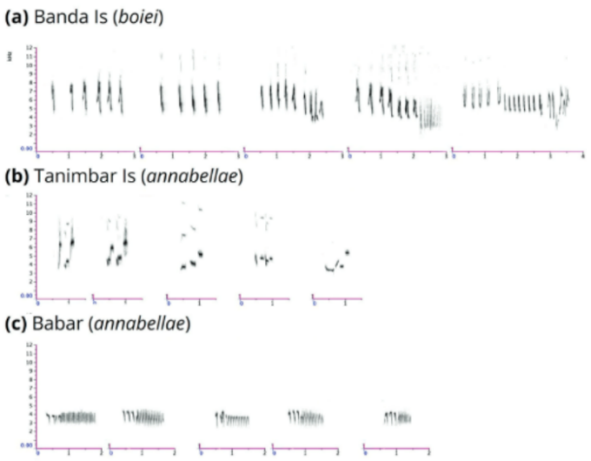


Figure 2:

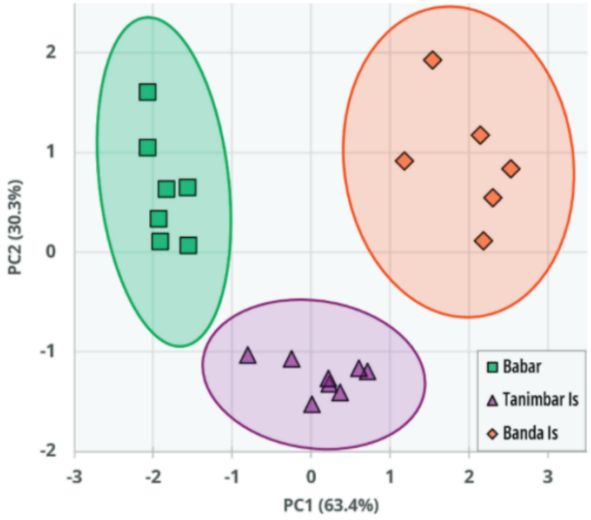


Figure 6. Principal component analysis (PCA) biplot for all vocal parameters (length of strophe, number of notes in each strophe, max. frequency, minimum frequency) showing differences in populations of *Myzomela boiei* from the Banda Islands, Tanimbar Islands and Babar. Ellipses represent 95% confidence intervals of the principal component scores for each population. Explained variance for each axis is given in parentheses.

Figure 1 and 2

Qualitative song descriptions from Berryman et al. 2025:

'The song of M. b. boiei (n = 6) comprises a series of 5–6 comparatively widely spaced high-pitched notes with a large bandwidth. These are sometimes followed by a 'flourish' of variable, lower-pitched more rapidly delivered notes (top row, Fig. 5). Strophes are the longest in the complex (1.7–2.5 seconds; mean 2.1) with the highest max. frequency (8.1–9.1 kHz, mean 8.4). The song of Tanimbar M. b. annabellae (n = 8) is a variable series of 3–5 simple notes, delivered over 0.5–0.8 second (mean 0.7) that fluctuate in frequency (mean range: 3.5–6.0 kHz) (middle row, Fig. 5). Tanimbar birds exhibit eventual variety (i.e. individuals sing a single song pattern multiple times [five examples shown in Fig. 5], then switch to a different song pattern that is repeated multiple times, then another, etc.) and while each of these song patterns differs slightly, all have a similar construction. In addition to the eight recordings we measured, seven additional songs of Tanimbar M. b. annabellae that could not be so analysed all audibly possessed the same structure. On Babar, M. b. annabellae has a totally different song, comprising 3–5 short introductory notes followed by a rapid, even-pitched trill, overall sounding rather like a bouncy ball (bottom row, Fig. 5). Strophes last 0.9–1.4 seconds (mean 1.1) and contain 13–23 notes (mean 17) delivered at a rate of 16–18 notes/second. All notes are comparatively low-pitched, with the entire strophe having a mean frequency range of 2.8–4.4 kHz. Birds from Babar exhibit less variation in their songs than either M. b. boiei or birds from Tanimbar, but there are some differences (including between strophes delivered by a single individual) in the number and shape of the introductory notes, as well as the length of the trill.'

For more details on songs, see:

Banda Island Myzomela: https://macaulaylibrary.org/asset/616087638

Tanimbar Myzomela: https://macaulaylibrary.org/asset/613342355

Babar Myzomela: https://macaulaylibrary.org/asset/609070462

Morphology

Myzomelas from Banda Island (*boiei*) are significantly larger than the other two taxa. Wing and tarsus measurements did not overlap with either of the two other taxa, whereas bill length only overlapped slightly with *babarensis* from Babar (and even in this case, the 0.1mm overlap was between the smallest female from Banda and the largest male from Babar).

Table 1: Morphometric summary of taxa *boiei* (Banda islands), *annabellae* (Tanimbar) and '*babarensis*' (Babar) (latter referred to as *M. b. annabellae* (Babar) in the third row of the table below)

Population		Wing	Tail	Bill length	Bill depth	Bill width	Tarsus
M. b. boiei (Banda Islands)	Males (n = 11)	**55.9 ± 1.2**^{A,B} (53.5–57.1)	**39.4 ± 3.0** (36.2–45.4)	**15.1 ± 0.7**^{A,B} (14.0–16.2)	**2.6 ± 0.2** (2.3–2.9)	**2.6 ± 0.1** (2.4–2.8)	**16.5 ± 0.5**^{A,B} (15.7–17.1)
	Females (n = 3)	**53.1 ± 1.0** (52.3–54.2)	**35.3 ± 1.3** (34.4–36.8)	**14.7 ± 0.6** (14.2–15.3)	**2.4 ± 0.1** (2.3–2.5)	**2.3 ± 0.1** (2.3–2.5)	**15.5 ± 0.2** (15.3–15.7)
M. b. annabellae (Tanimbar Islands)	Males (n = 3)	**49.8 ± 0.6**^{A,C} (49.1–50.2)	**36.4 ± 0.9**^{C} (35.8–37.4)	**13.2 ± 0.1**^{A,C} (13.1–13.3)	**2.4 ± 0.1** (2.2–2.5)	**2.5 ± 0.1** (2.4–2.6)	**14.0 ± 0.1**^{A} (13.9–14.1)
	Females (n = 0)	NA	NA	NA	NA	NA	NA
M. b. annabellae (Babar)	Males (n = 9)	**51.9 ± 0.9**^{B,C} (50.6–53.3)	**40.4 ± 1.4**^{C} (39.2–43.6)	**13.8 ± 0.3**^{B,C} (13.3–14.3)	**2.4 ± 0.2** (2.2–2.8)	**2.3 ± 0.1** (2.2–2.5)	**14.2 ± 0.7**^{B} (12.9–15.3)
	Females (n = 2)	**47.1 ± 2.1** (45.6–48.6)	**36.4 ± 3.5** (33.9–38.8)	**12.8 ± 0.3** (12.6–13.0)	**2.1** (NA; n = 1)	**2.1 ± 0.2** (2.0–2.2)	**13.5 ± 0.5** (13.1–13.8)

annabellae from Tanimbar islands and *babarensis* from Babar are more similar to each other morphologically (second and third rows of table respectively). However, *annabellae* is slightly smaller in wing, tail and bill length (unfortunately the sample size is small for this group [n=3]). Notably, tail length is 10% longer in *babarensis* than *annabellae*.

Plumage

Species limits in myzomelas have traditionally been diagnosed on the basis of male plumage. As such, we detail the male plumage here.

boiei has a broad breast band, which reaches lower breast area and has duskier underparts. *annabellae* and *babarensis* have breast bands confined to neck/upper breast.

annabellae has a blacker mantle which is less admixed with scarlet than *babarensis* – the latter has more extensive scarlet on its upperparts (figures 3 and 4).

Figure 3:

Figure 3. Ventral (above) and dorsal (below) views of male *Myzomela boiei* specimens. From left to right: *M. b. annabellae* (Tanimbars) AMNH 692710, 692709; *M. b. annabellae* (Babar) AMNH 692701, 692700, 692704; *M. b. boiei* (Banda Neira) AMNH 692712, 692714, 692713. Note the much broader black breast-band and duskier lower underparts of *M. b. boiei* (right). Compared to Tanimbars *M. b. annabellae* (left), birds from Babar (middle) have slightly more extensive scarlet on the upperparts.

Figure 3

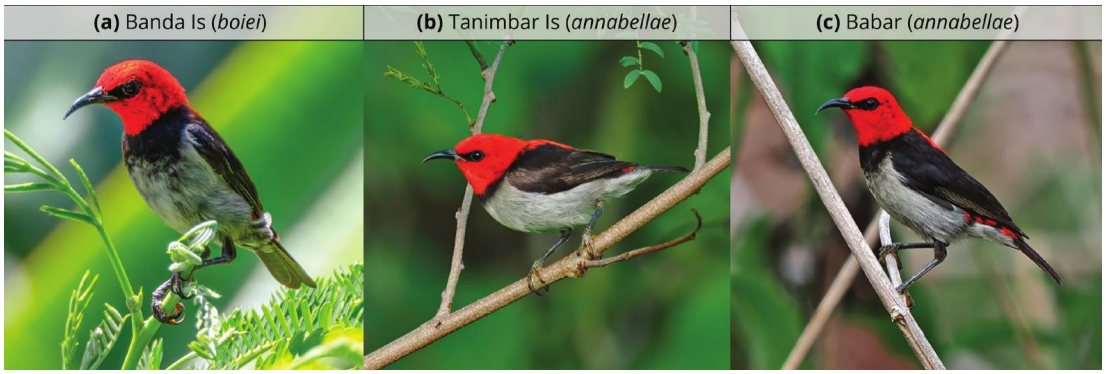


Figure 4

Playback experiments

Table 2

Results of playback experiments (n = 152) on three populations of *Myzomela boiei* (see Methods). Values in **bold** represent response scores, calculated as the proportion of birds subjected to experiments that responded to playback of each song type. Total sample sizes in parentheses. SR = strong response, MR = moderate response, NR = no response. Shaded cells represent playback of allopatric song.

		Song played		
		Tanimbar Islands	Babar	Banda Islands
Population tested	Tanimbar Islands	**0.86** 12 SR, 6 MR, 3 NR (n = 21)	**0.0** 20 NR (n = 20)	**0.0** 1 NR (n = 1)
	Babar	**0.0** 10 NR (n = 10)	**0.95** 17 SR, 4MR, 1 NR (n = 22)	**0.0** 1 NR (n = 1)
	Banda Islands	**0.0** 20 NR (n = 20)	**0.0** 18 NR (n = 18)	**1.0** 21 SR, 18 MR (n = 39)

Results from extensive playback experiments conclusively proved that Myzomelas were generally responsive to songs recorded from their own island(s), but not to songs belonging to taxa from other

island(s). Notable, there were no strong or medium responses to songs recorded from taxa from other island(s). Given the importance of passerine song in mate recognition, we believe that these results represent the most compelling evidence in this pre-proposal that the three taxa are evolutionarily distinct, and would not recognize each other as potential mates.

Genomics

Thus far, no genetic work has been done on this complex of myzomela.

Conclusion

The Tropical Asian RAG supports Berryman et al. 2025 description of *Myzomela babarensis* as a new species to science. In this pre-proposal, we support the recognition of *M. annabellae* and *M. babarensis* as species distinct from *M. boiei*, primarily based on bioacoustics differences, morphometrics, plumage characteristics and most significantly, the results of playback experiments conducted in the field which seem to indicate that their vocal differences have reproductive significance.

The three taxa are allopatric. Banda island is over 300km away from Tanimbar islands or Babar. Importantly, all three islands are separated by deep sea exceeding 300m in depth. Thus, although Tanimbar islands and Babar islands are separated by only 100km, they were not connected during Pleistocene sea level fluctuations, giving ample time for speciation and for differences between taxa to accrue.

Note that other myzomela species have been accepted on very similar basis – see summary figure at the start of pre-proposal. For example, Rote Myzomela was recognized as distinct from Sumba Myzomela on the basis of vocal differences, playback experiments, plumage differences (the extent of the black breast band) and morphometrics (Prawiradilaga et al. 2017). These reasons almost mirror the evidence presented within this pre-proposal. In a similar vein, Irham et al. 2020 described Alor Myzomela as distinct from Crimson-hooded Myzomela on this basis plumage differences and qualitatively different songs: despite a low mtDNA divergence between Alor and Crimson-hooded Myzomela, these taxa have been accepted as separate species.