

BIRDING AREA

Bidoup Nui Ba National Park and the Dalat Plateau, Vietnam: an extraordinary South-East Asian hotspot of endemism

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Introduction

Bidoup Nui Ba National Park (hereafter BNBPN), located in Lam Dong province, Vietnam, covers 70,038 ha of mixed coniferous and evergreen montane forest in the southern Annamite mountain isolate of the Dalat Plateau (midpoint 12.017°N 108.459°E). It is a vast wilderness area, roughly the size of Singapore, and constitutes an important area of biotic endemism. The Dalat Plateau has been declared an Endemic Bird Area of global significance (Stattersfield *et al.* 1998). Among South-East Asian mountain isolates, the Dalat Plateau boasts the highest number of endemic bird species and, given its vast expanses of remaining habitat, BNBPN is the major stronghold for most of them.

Modern ornithologists and birdwatchers have been visiting the Dalat Plateau for many decades, and the region is now on the itinerary of virtually every Vietnam birding trip. Specifically, wildlife aficionados target some of the well-known and iconic Dalat endemics during their trips, such as Grey-crowned Crocias *Laniellus langbianis*, Vietnamese Greenfinch *Chloris monguilloti* and no less than four regionally restricted laughingthrushes (Black-hooded *Garrulax milleti*, White-cheeked *G. vassali*, Orange-breasted *G. annamensis* and Collared *Trochalopteron yersini*). In this contribution, we focus on some of the lesser-known but no less remarkable avian endemics or specialties that often escape ornithologists' attention, be it because their taxonomic status remains contentious or because they have hitherto been poorly known. This contribution seeks to put the taxonomic spotlight on endemics that merit further inquiry, with the hope that future visitors will gather additional material on these birds.

Notable endemics and near-endemics to Dalat

Necklaced Barbet *Psilopogon auricularis*

Formerly subsumed under the regional Golden-throated Barbet *P. franklinii*, this denizen of high-elevation montane forest was recently separated as an independent species based on facial plumage and deep divergence of primarily mitochondrial

DNA (den Tex & Leonard 2013) (Plates 1 & 2). It is not strictly a Dalat endemic as it extends to the mountains of central Vietnam, but ornithologists will easily encounter it in BNBPN.

Annam Barbet *Psilopogon annamensis*

Following an earlier partial split by Collar (2006a), the primarily mitochondrial work of Feinstein *et al.* (2008) and den Tex & Leonard (2013) established that the Black-browed Barbet *P. oorti* (Plate 3) comprises four species, which may not be one another's closest relatives. One of these resultant species, Annam Barbet (Plate 4), is a mid-elevation denizen of montane forest endemic to the Dalat and Kon Tum ranges, where it mostly lives below the elevational range of the Necklaced Barbet.

Dalat Shrike-Vireo *Pteruthius annamensis*

The genus *Pteruthius* from montane tropical and subtropical Asia has long been known as the 'shrike-babblers', harking back to the days when they were assumed to be related to babblers Timaliidae. They are now known to be embedded within the vireos Vireonidae (Reddy & Cracraft 2007), and we here follow a recent proposal (Eaton *et al.* 2016) to refer to them under the more appropriate name 'shrike-vireo'. Within *Pteruthius*, the former White-browed Shrike-Vireo *P. flaviscapris* has gone through a particularly chequered taxonomic history because of its complicated distribution of vocal and plumage variation. Many modern sources follow the studies of Reddy (2008) and Rheindt & Eaton (2009) in separating Dalat's taxon *annamensis* as an independent species, the Dalat Shrike-Vireo, based on pronounced mitochondrial (c. 3.5–4.7%) and vocal differentiation. However, we contend that there is scope for additional knowledge: the vocal separation of *annamensis* from the adjacent Blyth's Shrike-Vireo *P. aeralatus aeralatus* from most of Thailand, Laos and Vietnam is based on its more rapid, machine-gun like delivery of song motifs (Figure 1), but a larger sample size was encouraged by Rheindt & Eaton (2009) for future research. Further inquiry is required into the affinity of

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Plate 1. Necklaced Barbet *Psilopogon auricularis*, Bach Ma NP, Vietnam, May 2017.

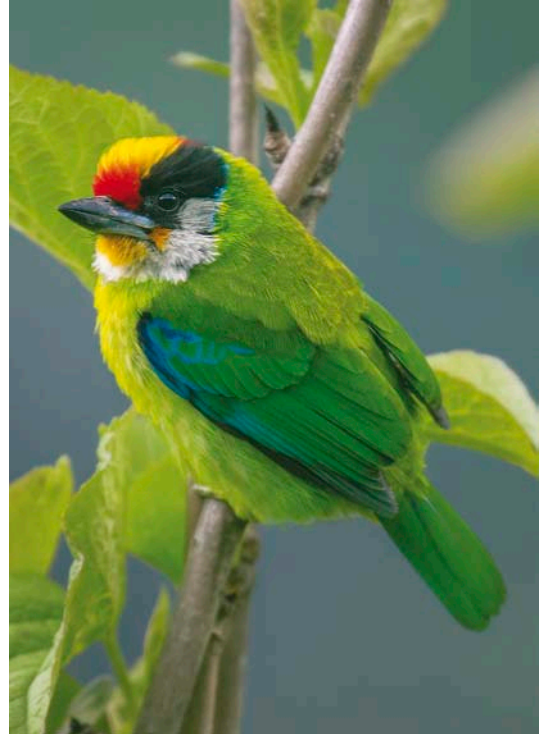


Plate 2. Golden-throated Barbet *Psilopogon franklinii*, Trongsa, Bhutan, April 2016.

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Plate 3. Black-browed Barbet *Psilopogon oorti*, Bukit Tinggi, Malaysia, August 2013.

Plate 4. Annam Barbet *Psilopogon annamensis*, Dalat Plateau, Vietnam, May 2018.

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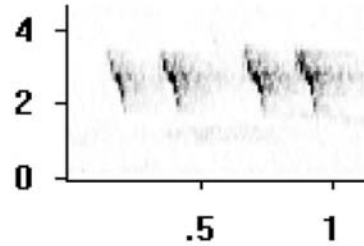
populations on mountain ranges adjacent to Dalat, such as the Cardamom mountains in Cambodia, although birdwatchers' photographic evidence seems to indicate that at least birds in Kon Tum (central Vietnam) belong to Blyth's Shrike-Vireo.

Yellow-crowned Green Magpie *Cissa [chinensis] margaritae*

Approximately 100 years ago, Robinson & Kloss (1919) described a novel species of *Cissa* magpie from Lang Bian mountain, within the present-day BNBPN. The new bird was meant to be named in honour of its collector, Mrs G. M. Vassal, whose real middle name, Maud, must have been mistaken for Margarita. Despite its uniquely distinct yellow crown, which instantly differentiates this bird from any other *Cissa* magpie, it was soon included within Common Green Magpie *C. chinensis*, under which most sources continue to list it to the present day. Recently, del Hoyo & Collar (2016) flagged this distinct Dalat endemic for potential species-level treatment, and we agree that future research may point to the need for taxonomic elevation. The Yellow-crowned Green Magpie (Plate 5) coexists with another remarkable congener, the Indochinese Green Magpie *C. hypoleuca hypoleuca*, but the two probably segregate along elevational and microhabitat lines: apart from

Figure 1. From Rheindt & Eaton (2009), showing the more rapid song motif delivery of Dalat Shrike-Vireo *Pteruthius annamensis* in comparison to a Blyth's Shrike-Vireo *P. aeralatus* from Chiang Mai, Thailand.

Chiang Mai (Thailand), Scharringa (2005)



Lang Bian (Da Lat, Vietnam), J. Eaton

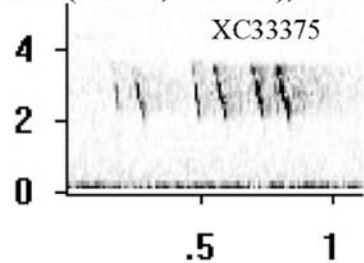


Plate 5. Yellow-crowned Green Magpie *Cissa [chinensis] margaritae*, BNBPN, Dalat, Vietnam, December 2017.





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Plate 6. Male Rufous-gorgeted Flycatcher *Ficedula strophinata fuscogularis*, BNNP, January 2018.

Plate 7. Male Rufous-gorgeted Flycatcher *Ficedula strophinata strophinata*, Doi Lang, Chiang Mai, Thailand, February 2013.



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Plate 8. Female 'Dalat Niltava' *Niltava [grandis] decorata*, BNNBP, February 2018.

a recent unpublished record from Kon Tum (James Eaton *in litt.*), the Yellow-crowned Green Magpie has only ever been recorded inside evergreen forest at higher elevations or on ridges of stunted growth in poor edaphic conditions within BNNBP, such as Lang Bian, Bidoup and Hon Giao mountains, whereas the Indochinese Green Magpie occurs more widely across the Dalat Plateau, including at mid and lower elevations, in a matrix of evergreen forest and adjacent pine savannah. On Bidoup mountain, we found both species in close proximity, with the Yellow-crowned Green Magpie above the main camp at nearly 2,000 m elevation inside evergreen forest, and the Indochinese Green Magpie c. 300 m away, below the forest edge in mixed pine growth.

Rufous-gorgeted Flycatcher *Ficedula strophiatea fuscogularis*

This flycatcher is a widespread montane breeder across the Himalaya, west China and Myanmar, but occurs on the Dalat Plateau in the form of a widely disjunct outlier population that has been afforded subspecies rank as *fuscogularis* (Plate 6). This is almost entirely restricted to evergreen forest at higher elevations in central Vietnam, adjacent Laos, and in BNNBP, e.g. on Bidoup, Lang Bian and neighbouring peaks and ridges. Its morphological



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Plate 9. Female Large Niltava *Niltava grandis*, Phia Den NP, East Tonkin, Vietnam, October 2019.

distinctions are impressive: males sport a paler, much less black-faced plumage with a significantly more extensive rufous breast gorget than nominate *strophiatea* (Plate 7). Investigations into its levels of vocal and DNA differentiation from the nominate form are urgently needed. This may be a good candidate for future elevation to species level.

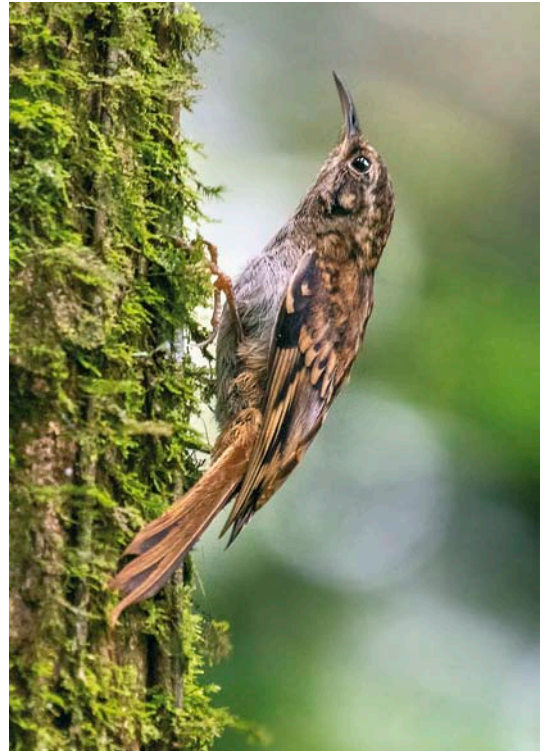
Dalat Niltava *Niltava [grandis] decorata*

Most sources continue to list Dalat's population of niltavas (*decorata*) under the Large Niltava *N. grandis*. However, as noted by Eaton *et al.* (2016), the local population has a unique song consisting of 2–3 melancholy descending notes that radically differs from the 3–4 ascending notes uttered throughout the remainder of the species' range. Morphologically, the Dalat Niltava's female (Plate 8) is distinguished from most other females through a blue rather than brown crown (Plate 9), although the female of the distant Peninsular Malaysian race *deceptiens* somewhat approaches her in this character. A recent study using c. 4,000 genome-wide markers has added an intriguing twist to this story (Lim *et al.* 2020): Large Niltava samples from most of the nominate range (ssp. *grandis*) in Indochina, Thailand, Myanmar and north-east India were genomically diverged from the Sundaic

subspecies *decepiens* (Malay Peninsula, Sumatra), but two samples from the south-east Thai mountain range in Chanthaburi (adjacent to Cambodia)—within the range of *grandis*—emerged as genomically closer to Sundaic *decepiens*. It is not clear where exactly in Vietnam the ‘Annam’ samples used in this study were collected (Table 1 in Lim *et al.* 2020). More geographic sampling is needed to ascertain whether the Chanthaburi birds may actually be representative of Dalat’s *decorata* (connected through the Cambodian Cardamom range). If so, it would indicate that the commonalities in female plumage of Dalat’s *decorata* and Malaysia’s *decepiens* are based on their common genomic origin, geographic separations notwithstanding (see section on leapfrog pattern, below).

Dalat Treecreeper *Certhia [manipurensis] meridionalis*

Tietze *et al.* (2006) used vocal and genetic characters to divide the Brown-throated Treecreeper *C. discolor* into a Himalayan species, Sikkim Treecreeper *C. discolor* and a South-East Asian montane species, Manipur (Hume’s) Treecreeper *C. manipurensis*. They conceded, however, that ‘morphological differences within *C. manipurensis*... are striking, and we would not be surprised to find strong genetic differences between these taxa’



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Plate 10. Dalat Treecreeper *Certhia [manipurensis] meridionalis*, Dalat, June 2019.

Plate 11. Grey-crowned Bushtit *Aegithalos annamensis*, Dalat, March 2015.



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(Tietze *et al.* 2006). The most distinctive member to which they referred is Dalat's endemic taxon *meridionalis* (Plate 10), sadly unsampled by Tietze *et al.* (2006), which is the geographically most isolated population and the only member of the complex that lacks any warmish tones on the underparts. Future genetic and vocal inquiry may elevate this form to species level.

Grey-crowned Bushtit *Aegithalos annamensis*

Formerly subsumed in the Black-throated Bushtit *A. concinnus* complex, the southern Annamite taxon *annamensis* (Plate 11) was first shown to be mitochondrially distinct by Johansson *et al.* (2016). Their genetic conclusions were later complemented by plumage analysis (del Hoyo & Collar 2016). The species extends to southern Laos and central Vietnam, so it is not strictly a Dalat endemic, but the Dalat Plateau is a great place to see it.

Brown-backed Bulbul *Hemixos [flavala] remotus*

The Ashy Bulbul *H. flavala* is widespread in montane and hill forest throughout South-East Asia and the Himalaya. The relatively isolated subspecies from Dalat and neighbouring mountains, *remotus*, is morphologically one of the most distinct constituents. It differs from the geographically closest subspecies from northern Vietnam and

Laos, *hildebrandi* and *bourdellei*, respectively, in its brown (not greyish) back and crown (Plate 12), which has earned it the English name 'Brown-backed Bulbul' (del Hoyo & Collar 2016).

Annam Prinia *Prinia rocki*

A comprehensive mitochondrial and bioacoustic re-assessment of the species limits within the Brown Prinia *P. polychroa* has led to the recognition of Dalat's subspecies *rocki* (Plate 13) as a species-level taxon, now known as Annam Prinia (Alström *et al.* 2019). The species can be found in both central and south Annam, and is known to exhibit strong seasonal changes in plumage saturation (more saturated buffy in fresh plumage). This bird has definitely not been on the regular birders' path in Dalat, and is most easily tracked down at slightly lower elevations on the ascent to the plateau in dry, scrubby open vegetation.

Dalat Grasshopper Warbler *Locustella [mandelli] idonea*

In a comprehensive vocal, morphological and DNA analysis of the Russet Grasshopper (Bush) Warbler *L. mandelli* complex, Alström *et al.* (2015) proposed to elevate *idonea* (Plate 14), the taxon endemic to Dalat and neighbouring mountains of central Vietnam, to species level. Mitochondrial differences

Plate 12. Brown-backed Bulbul *Hemixos [flavala] remotus*, Dalat, July 2020.





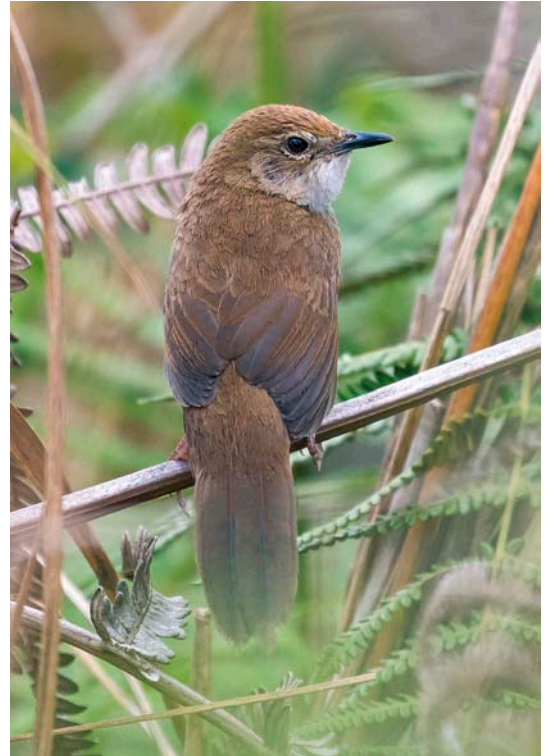
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Plate 13. Annam Prinia *Prinia rocki*, Dalat, January 2017.

between *idonea* and the main *mandelli* cluster were extremely low (at c. 0.8%), and song differences were slight. However, Alström *et al.* (2015) revealed similarly shallow differentiation between Russet *L. mandelli* and Sichuan Grasshopper Warblers *L. chengi*, two seemingly unequivocal species in light of their co-occurrence in areas without apparent interbreeding. These authors therefore argued that relatively shallow phenotypic and genetic differences can be indicative of species status in this complex. Whether a species or not, the Dalat Grasshopper Warbler is thin on the ground and highly localised. The best key to its presence is its distinct insect-like vocalisation.

Dalat Spectacled Warbler *Phylloscopus [intermedius] ocularis*

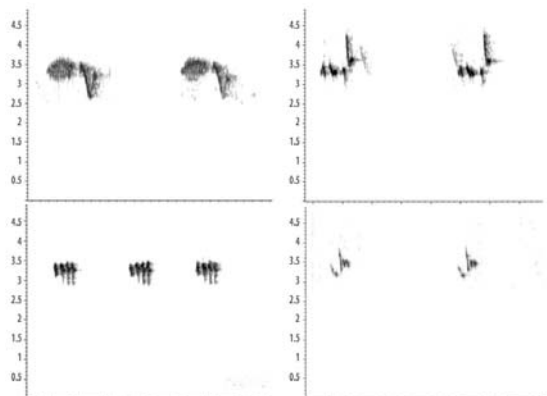
‘Spectacled warblers’, formerly assigned to their own genus *Seicercus*, are amongst the most confusing Asian birds in terms of classification (Rheindt 2006, Martens 2010). Within them, the least taxonomic clarity has been achieved for the White-spectacled Warbler *P. intermedius* superspecies, despite painstaking molecular work by Olsson *et al.* (2004). The complex songs in this group of warblers exhibit substantial variation, and do not lend themselves to easy bioacoustic analysis. The call notes, however, have long been known to differ substantially among populations (Figure 2; Rheindt 2006). The isolated taxon *ocularis* from the Dalat Plateau may be one of the strongest candidates for species status within the White-spectacled Warbler complex because of its distinct four-note call at level pitch, which differs significantly from the 2–4 note calls from Fujian and Sichuan provinces, China, widely available in sound libraries. However, its mitochondrial divergence from populations in China is weak (c. 1.5–1.9%) (Olsson *et al.* 2004), furnishing no strong



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Plate 14. Dalat Grasshopper Warbler *Locustella [mandelli] idonea*, Dalat, March 2018.

Figure 2. Sonograms of the calls of members of the White-spectacled Warbler *Phylloscopus intermedius* complex from throughout its eastern range, illustrating the considerable variation in calls: Sichuan, top left (XC158202); Kinmen Island off Fujian (politically part of Taiwan), top right (XC347712); Dalat Plateau, bottom left (XC200844); and Fujian, bottom right (XC379311). All recordings were obtained from www.xeno-canto.org, with accession numbers given in parentheses.



evidence either in favour or against splitting. Clearly, more vocal and genomic study is required for the entire species complex, with the crucial inclusion of Himalayan populations (subspecies *zosterops*).



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Plate 15. Indochinese Wren-Babbler *Rimator danjoui danjoui*, BNBPN, March 2018.

Indochinese Wren-Babbler *Rimator danjoui danjoui*

The type specimen of this furtive and sought-after species (previously referred to as Short-tailed Scimitar Babbler) was collected on Lang Bian within BNBPN. Other races differ in their shorter bills and minor plumage distinctions, but much additional undescribed taxonomic diversity has been proposed within the species complex (Vogel *et al.* 2003, del Hoyo & Collar 2016). A comprehensive genetic and vocal exercise is needed to assess how distinct the endemic nominate form from Dalat may be (Plate 15).

Vietnamese Cutia *Cutia [nipalensis] legalleni*

Given substantial differences in underparts barring, Collar (2006b) separated the Dalat-endemic taxon *legalleni* as an independent species, Vietnamese Cutia (Plate 16). The case for splitting this form is somewhat complicated by the occurrence of the taxon *hoae*, with an intermediate underparts pattern, in central Vietnam, bridging *legalleni* with nominate cutia populations (*C. n. nipalensis*, (Plate 17) further north. Additional analysis is required to shed light on the true taxonomic affinity of *hoae*.

Black-crowned Fulvetta *Schoeniparus klossi*

Based on pronounced plumage differences—a

sooty-black crown with off-white streaking, dull pale rufous-ochre wings and a narrower supercilium—Collar (2006b) convincingly split the Dalat endemic Black-crowned Fulvetta (Plate 18) from the more widespread Rufous-winged Fulvetta *S. castaneiceps* (Plate 19). This is one of the more difficult endemics to find as it is restricted to higher elevations within BNBPN.

Bidoup Fulvetta *Fulvetta [danisi] bidouensis*

Only described in 1995, in a publication dated 1994 (Eames *et al.* 1994), the Bidoup Fulvetta (Plate 20) is currently considered a subspecies of the Indochinese Fulvetta *F. danisi* by all authorities. The taxon is restricted to Bidoup inside BNBPN as well as a nearby peak, Chu Yang Sin, on the northern periphery of the Dalat Plateau. In their initial description, Eames *et al.* (1994) pointed to a sufficient number of plumage differences to suggest that future research may demonstrate the Bidoup Fulvetta to be a distinct species. The situation certainly requires more research: nominate *danisi* is currently known only from peaks in Laos, while populations of unknown affinity from the mountains of Kon Tum in central Vietnam look distinctly different from *bidouensis* (Plate 21) in the amount of grey versus brown in the general plumage.

Annam Fulvetta *Alcippe* [*peracensis*] *annamensis*

The ‘nun-babblers’ of the genus *Alcippe* have caused a substantial taxonomic headache in the past, with multiple DNA-based revisions of species limits (Zou *et al.* 2007, Song *et al.* 2009). An obvious case of suspicious present-day taxonomic treatment is Mountain Fulvetta *A. peracensis*, which has—unfortunately—received limited genetic attention. Its two constituents, *peracensis* from Peninsular Malaysia and *annamensis* from Dalat and neighbouring mountains in Laos and central Vietnam, are geographically disjunct and not likely to be each other’s closest relatives. A future upgrade of *annamensis* to species level is possible once vocal and genetic analyses have been completed.

Annam Sibia *Heterophasia* [*desgodinsi*] *robinsoni*

The Black-headed Sibia *H. desgodinsi* exhibits considerable plumage variation that comes in three broad themes, one of them displayed by Dalat’s endemic *robinsoni* (Plate 22), which has unique auricular streaking, the thickest eye-ring and a lack of brown back colouration typical of the adjacent taxa *kingi* (central Vietnam) (Plate 23) and *engelbachi* (Laos). Given that this plumage variation is at the same order of magnitude as that shown between other *Heterophasia* sibilas, future recognition as an independent species seems possible, although present-day treatments are yet to follow this stance.

Annam Sunbird *Aethopyga* [*gouldiae*] *annamensis*

Mrs Gould’s Sunbird *A. gouldiae* has a widespread montane Oriental distribution. Within it, the taxon *annamensis* (Plate 24), endemic to Dalat and adjacent Laos, is unique in lacking both a yellow rump and the broad red breast-band that is typical of the adjacent taxon *dabryii* from northern Indochina (Plate 25). Species status, previously flagged under the name Annam Sunbird (del Hoyo & Collar 2016), may be appropriate. In the Dalat Plateau, this is the common sunbird at high elevations. Attributions of Green-tailed Sunbird *A. nipalensis ezrai* to Dalat are erroneous: the type of *ezrai* was collected in Kon Tum province.

Dalat Sunbird *Aethopyga* [*saturata*] *johnsi*

The Black-throated Sunbird *A. saturata* is a mid-elevation replacement of Mrs Gould’s Sunbird. Like the latter, the Black-throated Sunbird is represented in Dalat by a uniquely coloured taxon, *johnsi* (Plate

26), whose plumage radically departs from that of all other subspecies, including neighbouring *saturata* (Plate 27), in showing a broad red breast-band. Del Hoyo & Collar (2016) flagged this plumage variation as suggesting a potential future split, but attributed the name ‘Langbian Sunbird’ to this taxon, despite the fact that it is outnumbered on Lang Bian by Annam Sunbird *A. [gouldiae] annamensis* and can mostly be found at lower elevations on the Dalat Plateau. We instead suggest the name Dalat Sunbird.

Additional endemic subspecies**Rufous-throated Partridge *Arborophila rufogularis annamensis***

In South-East Asian mountains, Rufous-throated Partridge is always the highest-elevation member of the *Arborophila* radiation, generally occurring above the range of other congeners. The Dalat Plateau has its endemic race, *annamensis* (Plate 28), said to be characterised by a whitish throat (Robson 2008). Shy and difficult to track down in the past, the species has now become easy to observe at feeding stations within BNBPN, where excellent photographic material from the last three years has shown that the local population is by no means as white-throated as the literature claims, and closely resembles the adjacent subspecies *guttata* from central Vietnam.

Bar-backed Partridge *Arborophila brunnepectus albigula*

This is a partridge of South-East Asia’s mid-elevations, represented on the Dalat Plateau by its endemic race *albigula* (Plate 29), with supposedly ‘whiter head markings’ than other races, including the central Vietnamese *henrici* (Madge & Gowan 2002). More research is required into these subspecific delimitations as a review of the limited recent photographic material suggests that facial colouration across Indochina differs clinically.

Silver Pheasant *Lophura nycthemera annamensis*

Owing to hunting pressure, this species has become extremely rare throughout much of Vietnam. In Dalat, it is represented by the endemic race *annamensis*, which is said to differ from neighbouring Indochinese races only in minor plumage differences. Modern encounters with this and neighbouring races are limited, and their survival depends on the last wilderness areas with a strict enforcement of poaching bans, such as BNBPN.



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Plate 16. Vietnamese Cutia *Cutia [nipalensis] legalleni*, Dalat, March 2019.

Plate 17. Himalayan Cutia *Cutia [nipalensis] nipalensis*, Sikkim, India, April 2015.



PAUL VAN GIESSBERGEN



JANOS OLAH

Plate 18. Black-crowned Fulvetta *Schoeniparus klossi*, BNBNP, March 2017.

Plate 19. Rufous-winged Fulvetta *Schoeniparus castaneus*, Kon Tum, Vietnam, July 2019.



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Plate 20. Bidoup Fulvetta *Fulvetta [danisi] bidouensis*, Bidoup summit, BNBPN, April 2019.

Plate 21. Bidoup Fulvetta *Fulvetta danisi* ssp., Ngoc Linh Nature Reserve, Kon Tum, Vietnam, July 2019. Birds at Kon Tum look subtly different from *bidouensis* on Bidoup mountain, and may be an undescribed taxon.



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Plate 22. Annam Sibia *Heterophasia [desgodinsi] robinsoni*, Dalat, February 2018.

Plate 23. Black-headed Sibia *Heterophasia desgodinsi kingi*, Central Highlands, Vietnam, May 2016.



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Plate 24. Annam Sunbird *Aethopyga [gouldiae] annamensis*, Dalat Plateau, March 2018.

Plate 25. Mrs Gould's Sunbird *Aethopyga gouldiae dabryii*, East Tonkin, March 2020.



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Plate 26. Dalat Sunbird *Aethopyga [saturata] johnsi*, BNBNP, December 2015.

Plate 27. Black-throated Sunbird *Aethopyga saturata saturata*, East Tonkin, January 2018.



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MOHIT KUMAR GHATAK

Plate 28. Rufous-throated Partridge *Arborophila rufogularis annamensis*, Dalat, July 2018.

Plate 29. Bar-backed Partridge *Arborophila brunnepectus albigula*, Dalat, May 2019.



TANG A PAU



Plate 30. Lesser Shortwing *Brachypteryx leucophris langbianensis*, Dalat, February 2018.

Lesser Shortwing *Brachypteryx leucophris langbianensis*

Although seemingly uniform in vocalisations, the Lesser Shortwing presents a confusing chequerboard pattern of plumage variability across the Himalaya and South-East Asia, with the males of some races sporting blue plumage while others are all hen-coloured. Dalat's endemic race *langbianensis* (Plate 30) is unique in having a brown-backed male that can nevertheless easily be told from females and males of other hen-coloured subspecies, e.g. *leucophris* (Plate 31), by its more slate-grey flanks and more striking loreal stripe.

Green-backed Tit *Parus monticolus legendrei*

The Green-backed Tit is a familiar component of the avifauna of the Himalaya, the mountains of mainland China and Taiwan and, intriguingly, the lowlands of central Laos and adjacent Vietnam. On the Dalat Plateau, it is represented by a geographically isolated outlier, taxon *legendrei*, with a much less vivid plumage dominated by an outsized ventral stripe. Although the plumage is distinct enough to have been flagged as of potential taxonomic significance (del Hoyo & Collar 2016), genetic research has demonstrated limited divergence, indicating that subspecies *insperatus* from Taiwan may be its closest relative (Wang *et al.* 2013).

Yellow-browed Tit *Sylviparus modestus klossi*

A species of predominantly Himalayan and Chinese distribution, the Yellow-browed Tit is one of the most unobtrusive members of Asia's montane avifauna. Subspecies *klossi* in Dalat is a distantly isolated outlier, said to be brighter and yellower overall (Robson 2008). However, both plumage and vocalisations are



Plate 31. Lesser Shortwing *Brachypteryx leucophris leucophris*, East Tonkin, December 2018.

generally inconspicuous in this species, making them of limited use for taxonomic purposes.

Ochraceous Bulbul *Alophoixus ochraceus hallae* Puff-throated Bulbul *Alophoixus pallidus khmerensis*

The plumage characters that separate these two species through most of their range, such as back and underparts colouration, become less clear-cut in this area, so that each species' local population is considered a narrowly confined subspecies with somewhat atypical colour traits: *hallae* in Ochraceous Bulbul and *khmerensis* in Puff-throated Bulbul. Nuclear DNA data are consistent with the hypothesis that local Ochraceous Bubluls (*hallae*) may exhibit genomic admixture from Puff-throated Bubluls through occasional hybridisation (Fuchs *et al.* 2015), advocating that the Dalat Plateau may constitute a hybrid zone, and that the plumage characters of *hallae* and *khmerensis* may actually be based on genetic introgression. On the southern ascent to the Dalat Plateau (e.g. around Di Linh), birds are confidently assigned to Ochraceous Bulbul, but species assignment becomes harder as one moves north into increasingly admixed populations.

Mountain Bulbul *Hypsipetes mcclllandii griseiventer*

Throughout its range, Mountain Bulbul is characterised by distinctly-coloured subspecies. The Dalat Plateau is no exception: subspecies *griseiventer* (Plate 32)—with grey underparts—lacks the typical buff or brown-tinged breast of neighbouring subspecies further north (Plate 33), although *canescens* from the isolated Cambodian Cardamom hills is an even duller extension of this plumage theme.



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Plate 32. Mountain Bulbul *Hypsipetes maclellandii griseiventer*, BNBPN, March 2020.

Plate 33. Mountain Bulbul *Hypsipetes maclellandii similis*, West Tonkin, Vietnam, December 2017.



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Rufescent Prinia *Prinia rufescens dalatensis*

Dalat's native subspecies of Rufescent Prinia, *dalatensis* (Plate 34), which extends south into Cochinchina, lacks the distinctive white loreal stripe of other races in breeding plumage, making it one of the more well-defined subspecies.

Grey-throated Babbler *Stachyris nigriceps rileyi*

A new genome-wide study (Lim *et al.* 2020) using museum toepad DNA material from throughout the wide range of the complex indicates that the Grey-throated Babbler may be split into four different species, each divided by apparent barriers to historic gene flow: 'Himalayan Montane Babbler' *S. [n.] nigriceps* (Himalaya to west Myanmar), 'Indochinese Montane Babbler' *S. [n.] yunnanensis* (east Myanmar to Indochina), 'Malayan Montane Babbler' *S. [n.] larvata* (Malay Peninsula to Sumatra) and 'Bornean Montane Babbler' *S. [n.] borneensis* (Borneo). Meanwhile, the race restricted to Dalat and adjacent ranges in central Vietnam and Laos, *rileyi*, may well be one of the most distinct in plumage: the faded facial markings of *rileyi* remain unmatched among most other subspecies. Even so, genomically *rileyi* is embedded within the widespread 'Indochinese Montane Babbler' which extends northwards into Yunnan and Guangxi provinces, China.



TANG A PAU

Plate 34. Rufescent Prinia *Prinia rufescens dalatensis*, Cat Tien NP, Vietnam, May 2018.

Red Crossbill *Loxia curvirostra meridionalis*

Dalat's pine savannahs host the southernmost outlier population of the northern hemispheric Red Crossbill, known as subspecies *meridionalis* (Plate 35). Taxonomic opinion on temperate and boreal crossbill

Plate 35. Red Crossbill *Loxia curvirostra meridionalis*, Dalat, January 2018.



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populations are undergoing a fair amount of flux, which may have caused some excitement also with regards to *meridionalis*. However, we are unaware of deep bioacoustic differences between Vietnam's birds and those in northern Asia. Subspecies *meridionalis* is likely a remnant of Holocene southbound flights in response to global cooling, and may therefore not be very deeply diverged.

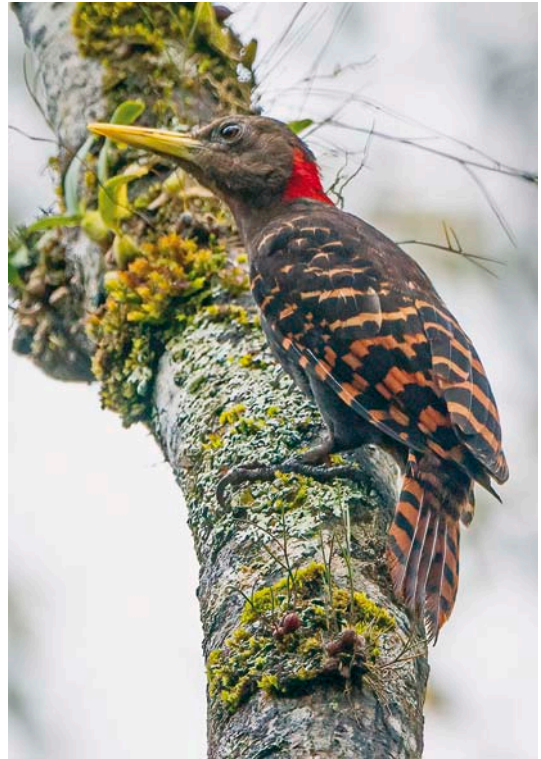
Dalat is a unique terminus of a South-East Asian montane leapfrog area

In addition to the pronounced element of avian endemism found on the Dalat Plateau, it is here that we encounter multiple widespread montane South-East Asian birds that share their closest vocal or plumage similarities not with adjacent populations in central Vietnam and Laos, but with distant populations, often in Peninsular Malaysia, that are separated by a string of dissimilar populations in between. This evolutionary and biogeographic mode of distribution, in which two similar terminal populations are separated by dissimilar intervening populations, is known as a 'leapfrog pattern' (Renssen 1984), and has been well-characterised in linear mountain ranges such as the Andes of South America. In Asian birds, leapfrog patterns have been found in archipelagic situations such as eastern Indonesia (Rheindt *et al.* 2011, Ng *et al.* 2017). In the following, we provide an overview of the avian participants of this leapfrog pattern that involves Dalat at the south-eastern terminus of a chain of populations (Figure 3).

Bay Woodpecker *Blythipicus pyrrhotis annamensis*

This widespread montane woodpecker's subspecies *annamensis* (Plate 36), which is endemic to the

Dalat Plateau, is known to be darker and to possess a smaller red neck-patch than the nominate subspecies from most of South-East Asia. Remarkably, at the south-western terminus of the South-East Asian mountain chain, the Peninsular Malaysian subspecies *cameroni* is characterised by



NGOC SAM THUONG DANG

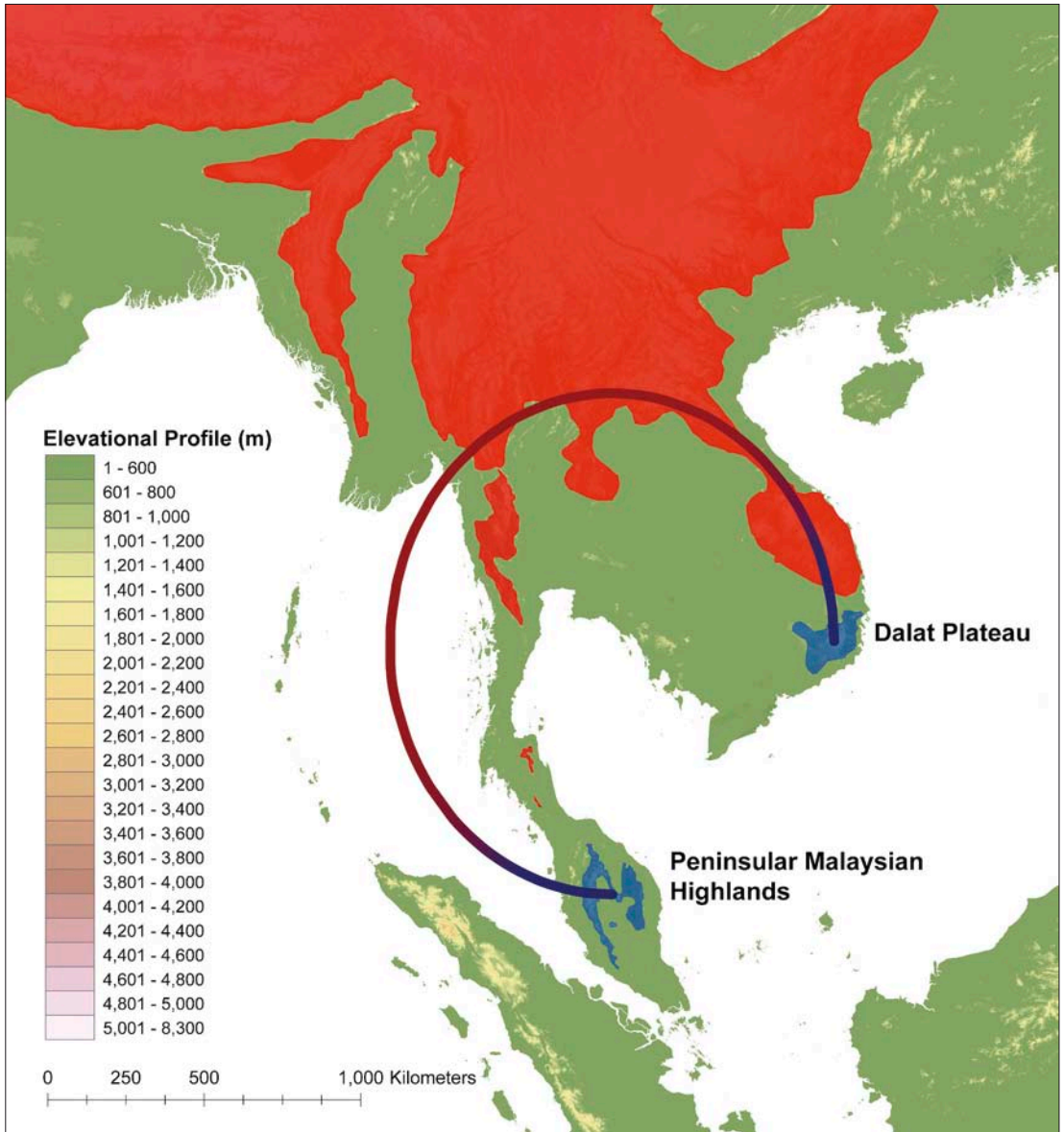
Plate 36. Bay Woodpecker *Blythipicus pyrrhotis annamensis*, Dalat, December 2019.

Plate 37. Rusty-naped Pitta *Pitta oatesi bolovenssis*, Dalat Plateau, June 2019.



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Figure 3. Map of South-East Asia with a schematic representation of a leapfrog pattern. The Dalat Plateau and the Peninsular Malaysian highlands are highlighted in blue, with intervening mountain ranges in red, illustrating the disjunct nature of the Malaysian and Vietnamese highlands.



the same plumage distinctions as *annamensis*, creating a notable leapfrog pattern in colouration.

Rusty-naped Pitta *Pitta oatesi bolovensis*

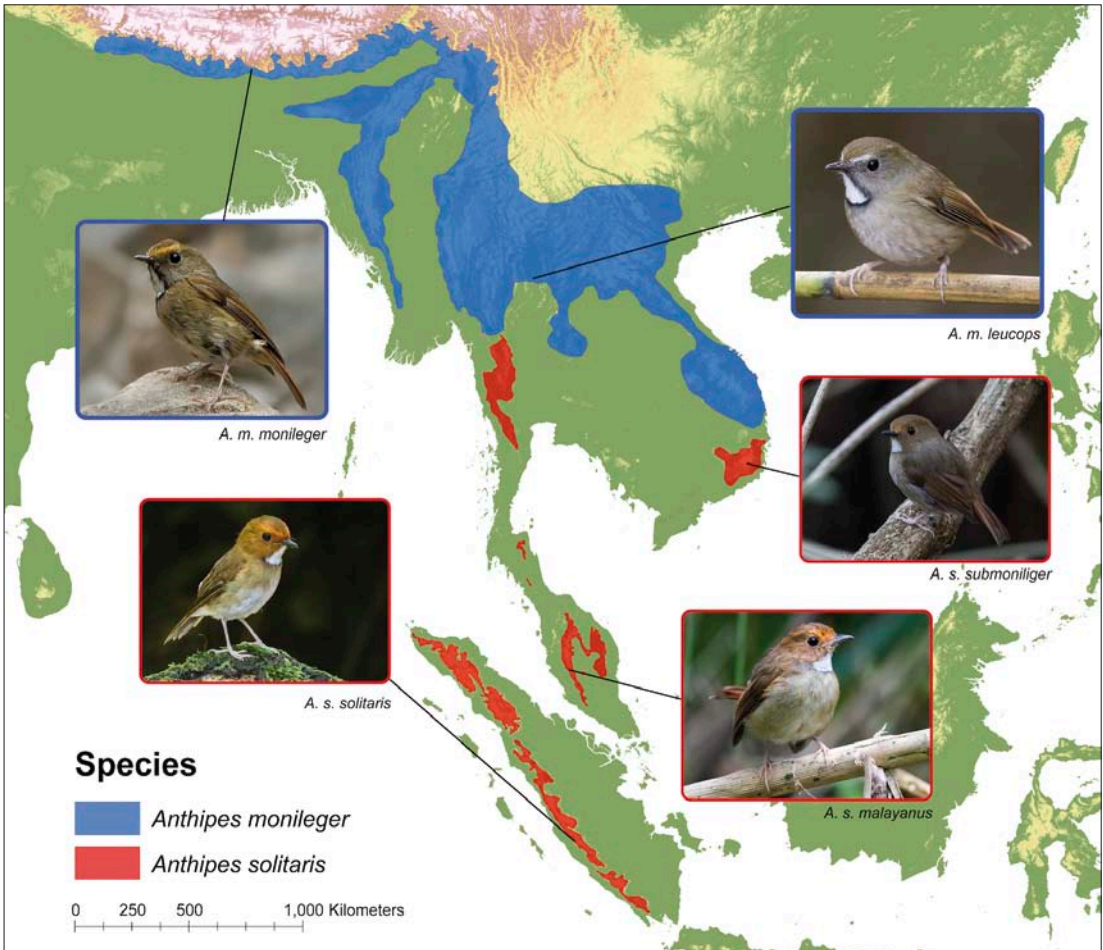
This sought-after pitta displays a similar plumage-based leapfrog pattern to the Bay Woodpecker. The subspecies endemic to Dalat and neighbouring parts of Laos, *bolovensis* (Plate 37), is described as bluer on the rump and pinker on the underparts than the more widespread nominate subspecies. Yet the Peninsular Malaysian endemic subspecies,

deborah, closely resembles *bolovensis* in all these described plumage distinctions.

Rufous-browed Flycatcher *Anthipes solitaris submoniliger*

The distinctive flycatcher genus *Anthipes* has two species, characterised by an almost identical high-pitched reeling song. Their geographic distribution across South-East Asia has been puzzling, but can be appropriately explained in the context of the Dalat leapfrog pattern. Rufous-browed Flycatcher

Figure 4. Distribution of Rufous-browed Flycatcher *Anthipes monileger* and White-gorgeted Flycatcher *A. solitaris* across South-East Asia, with subspecific plumages as depicted. The two mainland clusters of Rufous-browed Flycatcher (red) are separated via a chain of montane populations of White-gorgeted Flycatcher (blue), creating a leapfrog pattern. *A. m. monileger* West Bengal, India, May 2015 [Debapratim Saha]; *A. m. leucops*, Chiang Mai, Thailand, February 2013 [Jason Thompson]; *A. s. submoniliger*, Dalat, Vietnam, January 2016 [Yann Muzika]; *A. s. malayanus*, Pahang, Malaysia, September 2017 [Keita Sin]; *A. s. solitaris*, Jambi, Indonesia, September 2018 [Mike Nelson].



occurs at the two termini of the South-East Asian mountain chain, the Malay Peninsula in the south-west (*A. s. malayanus*) and the Dalat Plateau in the east (*A. s. submoniliger*), separated by thousands of square kilometres of montane habitat through northern Vietnam, Laos and Thailand that are inhabited by a close relative, the White-gorgeted Flycatcher *A. monileger* (Figure 4). Molecular studies may well corroborate the results of previous research on leapfrog patterns and conclude that the terminal members (i.e. the two Rufous-browed clusters) are not most closely related to each other.

Pygmy Cupwing *Pnoepyga pusilla annamensis*

The Dalat leapfrog pattern can manifest itself in bioacoustic traits. Minor individual variation notwithstanding, most South-East Asian Pygmy

Cupwings utter a song consisting of three well-separated, descending, high-pitched notes. The Dalat-endemic subspecies *annamensis*, however, only gives two such notes, and shares this characteristic with populations in Peninsular Malaysia (*harterti*) and other Greater Sundaic subspecies (*lepida*, *rufa*). The situation is complicated by the additional presence of two-note songs in the Himalaya, rendering the Pygmy Cupwing’s song distribution a complicated geographic mosaic. The darker plumage tone shared by *annamensis* and *harterti* extends the leapfrog pattern to morphological traits.

Plain Siva *Siva cyanouroptera orientalis*

The sivas of Dalat (*orientalis*) (Plate 38) have long been flagged as a potential split from the widespread



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Plate 38. Plain Siva *Siva cyanouroptera orientalis*, Dalat Plateau, November 2017.

Blue-winged Siva on account of their unusually drab plumage, which lacks most of the blue iridescence of other South-East Asian forms. Del Hoyo & Collar (2016) proposed the name Plain Minla (to be corrected to Plain Siva to adjust for the updated genus name). However, the situation is likely complicated and requires closer genetic inspection. Sivas from Peninsular Malaysia, *sordidior*, are similarly drab, almost matching *orientalis* in their lack of iridescence, and the mixed colour distribution of southern Cambodian *rufodorsalis* further complicates the picture.

Rufous-backed Sibia *Leioptila annectens eximia*

For now still called a 'sibia', this species is distantly related to the typical *Heterophasia sibilas* (Cai *et al.* 2019). The Dalat subspecies *eximia* (Plate 39) is radically different from most populations in lacking a rufous upper back and wings, and closely resembles the taxon *davisoni* (southern Myanmar and west Thailand) in these traits, creating a leapfrog pattern in which these two taxa are bridged by intervening populations with more extensive rufous colouration. The taxon *davisoni* has generated sufficient attention to be flagged as a possible upgrade to species level (del Hoyo & Collar 2016), but without mention of its close resemblance to *eximia*.

Does the Dalat Plateau host an undescribed form of Brown Bullfinch?

As reported in Robson (1998), on 11 February 1998 Craig Robson observed and tape-recorded eight bullfinches of what he believed to be a previously undescribed taxon on Lang Bian, inside BNNP. With their largely whitish heads (apart from the throat), the birds were thought to be a distinctive subspecies, if not a distinct species. There does not appear to be any post-1998 record of Brown Bullfinch *Pyrrhula nipalensis* from the Dalat Plateau. Lang Bian has meanwhile become a popular birdwatching destination, with numerous annual tour groups visiting, rendering a current regular occurrence of such bullfinches on the mountain unlikely. During a recent expedition to the higher Bidoup (c. 2,300 m), we spent multiple days searching specifically for bullfinches in the montane vegetation above 2,000 m, especially in the semi-stunted peak area, without success. Although Bidoup is the highest peak inside BNNP and within Lam Dong province, there is one higher peak on the Dalat Plateau, Chu Yang Sin in neighbouring Dak Lak province, that may warrant future searches. However, considering the lack of recent records despite intense ornithological attention around Dalat, Robson's record may refer to a group of wintering birds, perhaps from



Plate 39. Rufous-backed Sibia *Leioptila annectens eximia*, BNNP, September 2016.

unknown breeding locations in Laos. The latter hypothesis would be consistent with Robson's February date.

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