New biogeographic records for the avifauna of Taliabu (Sula Islands, Indonesia), with preliminary documentation of two previously undiscovered taxa

by Frank E. Rheindt

Received 8 June 2009

SUMMARY.—The Sula archipelago lies between Sulawesi and the northern Moluccas in Wallacea. The avifauna of the archipelago, including Taliabu, its largest and most diverse island, is under-explored, and current understanding is based on just one major historic collecting effort and several visits by modern ornithologists. There is limited knowledge especially of the highland birds of Taliabu, since only one ornithological expedition has reached this area, discovering in the process *c.*7 previously unrecorded species potentially meritorious of subspecific recognition. I describe the results of a two-week survey of Taliabu, encompassing both lowland and highland areas. An update is given on the state of the habitat on Taliabu, which has undergone major forest conversion and degradation due to logging, agricultural practices and forest fires. I present new elevational information for at least 14 bird species, and records of four species previously unrecorded on the island. Two of these represent undescribed taxa, one of them probably a new species. Comments on the taxonomy of several Taliabu birds are made on the basis of fresh vocal or morphological data, indicating that many endemic Sula races merit upgrading to species status. Given rapid forest loss on Taliabu, judicious collecting and genetic and vocal work on the taxonomy of its birds are urgently required.

The Sula Islands form a small and isolated Indonesian archipelago between Sulawesi and the Banggai Islands to the west and the Moluccan islands of Halmahera, Obi and Buru to the east. The Sula group comprises three major islands (Taliabu, Mangole and Sanana) and a wealth of smaller islets covering 9,632 km^2 (Fig. 1). At 2,913 km^2, Taliabu is the largest island in the archipelago (Fig. 1), but is also much more remote than the other two main islands, still lacking an airport as of 2009, and less densely populated than Sanana. Ecologically, Taliabu is also the most diverse of the archipelago, with mountains rising above at least 1,325 m (see Methods for further discussion), and the presence of a montane forest zone above 800 m. In contrast, Mangole rises barely above 800 m, and Sanana's highest elevation is *c.*450 m (GoogleEarth satellite imagery).

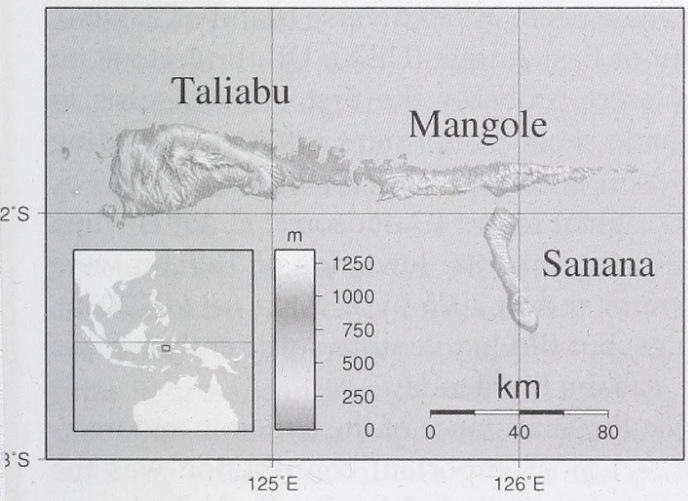


Figure 1. Map of the Sula Islands, showing the three main islands of Taliabu, Mangole and Sanana (=Sula Besi). Small inset (lower left) indicates the position of the Sula Islands within the Indonesian archipelago.

Whilst the Sula Islands are politically part of the Moluccan province of Maluku Utara (=North Maluku), biogeographically they constitute a transition zone between the Moluccas and Sulawesi. Moluccan influence notwithstanding, the Sula Islands' avian community is considered to be dominated

by Sulawesi elements. Hence, most ornithologists have assigned the Sula Islands to the zoogeographic region of Sulawesi, albeit at the status of a subregion (e.g. White & Bruce 1986, Coates & Bishop 1997). Despite the avifaunal link to Sulawesi in the west and the Moluccas in the east, the Sula avifauna is characterised by a sizeable endemic or near-endemic element (White & Bruce 1986), much of which is shared with the Banggai Islands to the west (ICBP 1992, Sujatnika *et al.* 1996, Stattersfield *et al.* 1998). In its initial assessment using the distributional and taxonomic knowledge of the day, ICBP (1992) listed nine range-restricted bird species exclusive to the Sula and Banggai groups. Consequently, the two archipelagos are treated as an Endemic Bird Area (ICBP 1992, Sujatnika *et al.* 1996, Stattersfield *et al.* 1998).

The faunal connection between Sula and Banggai has long puzzled zoologists, because the geographic position of the Banggai group, just 14 km off Sulawesi, seemingly contradicts the obvious faunal ties with the Sula Islands, more than 80 km distant. However, modern geologic, palaeoclimatic and bathymetric data go a long way to explain this unusual biogeographic link. Hall (2002) showed that the two groups form a tectonic unit that has been drifting west towards Sulawesi and has closely approached it only within the last four million years. In addition to their common geologic origin, the Sula and Banggai islands have also repeatedly been connected during *c.*20 glacial epochs within the last three million years, each lasting *c.*10,000–50,000 years. These connections arose when glacial periods caused global sea levels to fall by up to 130 m (Lambeck & Chappell 2001, Siddall *et al.* 2003, Thompson & Goldstein 2005, Bintanja *et al.* 2005, Caputo 2007), exposing shallow areas, such as the string of tiny islets that connect the Sula and Banggai archipelagos. On the other hand, the narrow strait between Sulawesi and the Banggai Islands has never accommodated a landbridge, being characterised by a deep-sea trench of *c.*400–700 m (Becker *et al.* 2009).

Ornithologically, the Sula Islands in general, and Taliabu in particular, have been much less well explored than most other Indonesian archipelagos of comparable size. Unlike the extensive historic collecting that has occurred on Sulawesi and throughout most of the Moluccas, the Sula Islands were visited by just a few collectors in the late 19th and early 20th centuries (White & Bruce 1986), with the most recent such visit, in 1938, by J. J. Menden the only significant collecting effort to have been undertaken on Taliabu (White & Bruce 1986). During a visit to Sanana and Mangole in December 1988, D. Yong (pers. comm.) was the first ornithologist to confirm the continued existence of most endemics after the world wars. These two islands may not have received any subsequent ornithological attention, as all recent visitors confined their activities to the ecologically more diverse island of Taliabu. In 1991, P. J. Davidson *et al.* from the University of East Anglia (UEA), UK, undertook an extensive exploratory survey of Taliabu. They were probably the first ornithologists to visit the highlands above 600 m, where they made several important findings, including potential new taxa (Davidson *et al.* 1991, Davidson & Stones 1993, Davidson *et al.* 1995, Stones *et al.* 1997). For simplicity, I refer to their original report (Davidson *et al.* 1991) when citing the findings of the UEA expedition. Following this, the lowlands of Taliabu were visited in March 1997 by F. Verbelen (pers. comm.) and in 2005 by B. King (*in litt.* 2006), who confirmed many of Davidson *et al.*'s findings, but did not venture sufficiently high to re-encounter the latter's novel records from the Taliabu highlands.

Apart from their important work in assessing the abundance of the endemic and near-endemic birds on Taliabu, Davidson *et al.*'s (1991) most important contribution was the discovery of seven passerines previously unrecorded in the Sula Islands, all of which '. . . may possibly represent undescribed endemic subspecies . . .' (Davidson *et al.* 1991: 37). These included new populations of Red-and-black Thrush *Zoothera mendeni* (formerly considered a subspecies of Red-backed Thrush *Z. erythronota*), Mountain Tailorbird *Orthotomus cuculatus*,

Island Leaf Warbler *Phylloscopus poliocephalus*, Mountain White-eye *Zosterops montanus*, Snowy-browed Flycatcher *Ficedula hyperythra*, Island Verditer Flycatcher *Eumyias panayensis* and Sulawesi Myzomela *Myzomela chloroptera* (formerly considered a subspecies of Scarlet Myzomela *M. sanguinolenta*). These new biogeographic records suggest that Taliabu merits renewed attention from field ornithologists, that additional novelties might await the intrepid explorer, and that the taxonomy of many bird species on Taliabu, not only those discovered by Davidson *et al.* (1991), is in urgent need of re-examination. In the future, fresh collecting efforts will be prerequisite as a foundation for genetic and morphological work into the taxonomic status of the island's birds, and further field studies will be invaluable to collect vocal data that might inform taxonomic decisions.

'The present contribution details the findings of a recent visit to Taliabu in April 2009, involving observations, photography and sound-recording of birds. No effort was made to collect birds, although the trip was undertaken with a view to facilitate future collecting efforts pending acquisition of a permit. I am currently involved in a dialogue with the Indonesian government agency, LIPI, with the aim of establishing a joint research project that will involve bird collecting. I frequented a wide range of habitats from sea level to montane forest. I reached the highlands in the interior of Taliabu at 1,100 m on three different occasions, surveying birds at probably the highest elevations ever on Taliabu. Survey work broadly aimed to determine species presence, but special efforts were made to document endemic taxa and those newly reported by Davidson *et al.* (1991) photographically or bio-acoustically. During the expedition, new elevational records were made for several species, whilst others were found on Taliabu for the first time. I also present new data on the taxonomy of most of Davidson *et al.*'s (1991) potential new endemic subspecies, and, most significantly, I provide preliminary documentation of two other new taxa that await description.

Study area and methods

On 4–18 April 2009, I was based in the village of Binadesa (01°43'S, 124°50'E) near Jorjoga (01°40'S, 124°48'E) on the central north coast of Taliabu. Birds were surveyed daily from morning until evening and—on several occasions—beyond dusk. Secondary forest from the coast to *c.*500 m was surveyed during day trips from Binadesa. On three occasions, I ventured into the central highlands of Taliabu along logging tracks to elevations up to 1,100 m; these trips each lasted 2–4 days. Photographs were taken using a Panasonic Lumix DMC-FZ18. Following the loss of better-quality equipment due to technical problems, sound-recordings were made using a Sony TCM-200DV cassette recorder with inbuilt microphone. Sonograms were prepared using Syrinx 2.6h by John Burt (available at www.syrinxpc.com). Elevations were measured using a barometric altimeter that was regularly calibrated at sea level. Note that montane camping excursions were conducted in highlands up to 1,100 m, from where surrounding elevations could be viewed. At the highest point reached, the peaks of the highest hilltops on the island were only slightly higher than my elevation, which is compatible with GoogleEarth satellite data that indicate a highest elevation of 1,325 m for Taliabu. In contrast, Davidson & Stones (1993), as well as older atlas sources, consistently refer to 1,649 m as the highest elevation on Taliabu. This older elevational reference is potentially flawed, since it agrees neither with satellite imagery nor with my own observations using a calibrated altimeter.

Recent state of habitat on Taliabu

Taliabu has undergone drastic habitat clearance in the last two decades. Primary lowland forest might be gone from the island, and logging companies have invaded the highlands up to 1,200 m along dozens of logging roads. The following assessment of habitat viability is based on my own observations. Although my field work was restricted to the central north of the island, extrapolations for the whole of Taliabu can be made by comparing field observations with satellite imagery from GoogleEarth.

The narrow (4-km-wide) central northern coastal plain in the vicinity of Menanga (01°42'S, 124°53'E) and Jorjoga held remnants of primary forest and extensive connecting secondary forest as recently as March 1997 (F. Verbelen pers. comm.). However, during the 1990s and the first years of the new millennium, Taliabu lost most of its lowland forest through logging by at least two different companies (P. Obrin pers. comm.). Villagers in Binadesa and Jorjoga reported that one of these two companies had logged the environs of their villages during two different periods each lasting 3–5 years. Several logging roads designed for heavy machinery were constructed into the interior highlands, subsequently facilitating easy access to villagers for opportunistic additional logging and agricultural habitat conversion after the companies' departure from Taliabu. I gained access into the highlands along two logging tracks, but satellite imagery indicates the presence of ten such tracks in the vicinity of Jorjoga and Menanga alone.

The coastal plain at Jorjoga and Menanga is now fully converted to coconut palm plantations and crop fields. Further inland, most areas below 600 m have been converted to orchards and gardens, although small patches of heavily degraded secondary forest persist in gullies. Above 600 m, there are few gardens and orchards, but forest along logging tracks is heavily degraded, as most of the taller trees in valleys have been removed and undergrowth has largely been cleared. Satellite imagery indicates that the ten logging tracks ascending south of Menanga and Jorjoga may have accounted for the degradation of >60% of montane forest habitat in these watersheds, and habitat degradation over the rest of the island is probably comparable, based on satellite images.

In addition, forest fires have caused large-scale destruction of montane forest above 750 m. According to villagers, a large fire in the 1980s (probably in 1982–83) was responsible for the loss of *c.*3,000 ha of montane forest (estimated from satellite imagery). The affected area covers *c.*70% of montane forest south of Jorjoga and Menanga, which is now characterised by grassy pasture with little bush growth and the presence of many tall old burnt snags. That little regrowth is observed in these areas >20 years after the incident indicates that some damage might have been permanent or is reinforced periodically through smaller fires. During my highland visits, only one small patch (*c.*100 ha) of dwarf montane forest above 1,000 m was found that had neither been affected by fires or logging, and this harboured a distinct avifauna undetected elsewhere on the island (see species accounts). Although more such habitat may persist elsewhere away from logging tracks, the threats posed by logging and fire mean that such habitat may be now very scarce and its specialised avian community therefore endangered.

Discouragingly, government prospectors were present during my stay, investigating the potential of the sub-montane and montane zone south of Jorjoga for conversion to plantation crops. Any future agricultural conversion would place further strain on the island's natural communities.

Species accounts

The following accounts relate new elevational, distributional, ecological or taxonomic information. Other species encountered but not mentioned below are listed in Table 1.

MEYER'S GOSHAWK *Accipiter meyerianus*

Single adults on 7, 9 and 12 April 2009, with a pair on 8 April 2009. Most sightings might involve the same two birds, generally at *c.*1,000 m, with a sighting at 700 m perhaps being an additional individual. Birds were heard briefly giving a courtship vocalisation (*ki ki ki ki ki*) but no sound-recording was obtained. Photographs of two birds were taken at 1,000 and 700 m, respectively (e.g. Fig. 2). All sightings were of birds perched on exposed branches in single tall trees within logged forest. My sightings of this unobtrusive raptor were probably made at a fortuitous season when a breeding pair was vocally and visually conspicuous. Their size, *Accipiter* shape and jizz, solid slate-grey upperparts and densely but weakly barred underparts, and the distinctive vocalisations, eliminate the possibility of a misidentification. These are the first records in the Sula Islands (White & Bruce 1986, Coates & Bishop 1997) and the westernmost of a species considered endemic to New Guinea and the Moluccas. Its occurrence on Taliabu suggests that the Moluccan element of the highland avifauna of the Sula Islands is more pronounced than anticipated. The only *Accipiter* previously assumed to occur on Taliabu is the much smaller Vinous-breasted Sparrowhawk *A. rhodogaster sulaensis*. Given that most Indo-Pacific islands possess 2–3 resident *Accipiter* species of different sizes, the occurrence of larger *A. meyerianus* next to smaller *A. rhodogaster sulaensis* is unsurprising, although one might have expected a second *Accipiter* on Taliabu to be another Sulawesi element (e.g. Spot-tailed Goshawk *A. trinotatus*). Given my records of *A. meyerianus* on Taliabu, the presumption that *A. rhodogaster sulaensis* constitutes a Sulawesi element must be verified. Pronounced plumage differences exist between *A. r. rhodogaster* of mainland Sulawesi and *A. r. sulaensis* (Coates & Bishop 1997; pers. obs.), and their conspecificity might not withstand phylogenetic scrutiny.

SULA SCRUBFOWL *Megapodius bernsteinii*

Only two brief sightings, of singles flushed at *c.*50 m and 400 m in dense bamboo undergrowth and degraded secondary forest, respectively. Endemic to the Sula and Banggai islands (White & Bruce 1986), previous field work had shown the species to occur up to 250 m in Taliabu (Davidson *et al.* 1991), but my record and information from villagers in Binadesa indicate that it might reach 200–300 m higher. According to the same villagers *M. bernsteinii* is intensively hunted for its tasty meat and its eggs are taken for human consumption. It must now be exceedingly rare on Taliabu given dramatic habitat degradation, hunting and egg collecting. An indication of its apparent decline is the scarcity of records during the present survey compared with the encounter rates by Davidson *et al.* (1991) and F. Verbelen (pers. comm.). Fishermen from Jorjoga (in north Taliabu) reported that the species has declined steeply on its tiny nesting islands off the north coast (e.g. Samada Besar) where it was formerly common. Nonetheless, the species' persistence in dense secondary bamboo thickets in the vicinity of villages indicates that it might be somewhat resistant to habitat destruction. But, given that undisturbed habitat at its preferred elevations has been reduced to tiny fragments, there are probably no large populations that could source re-expansions in the case of local extinctions of small populations. The situation might be equally dire elsewhere, e.g. in eastern Peleng in the Banggai Archipelago, where dramatic declines have occurred over the last decade (M. Indrawan pers. comm.). *M. bernsteinii* is listed as Near

TABLE 1

Species encountered on Taliabu (excluding seabirds close to shore), but not mentioned in the main text.

Species	Comment
Great-billed Heron *Ardea sumatrana*	One near Jorjoga
Brahminy Kite *Haliastur indus*	-
Sulawesi Serpent Eagle *Spilornis rufipectus sulaensis*	1+1
Rufous-bellied Eagle *Hieraaetus kienerii*	Minimum of two adults at 800 m
Vinous-breasted Sparrowhawk *Accipiter rhodogaster sulaensis*	One adult at 200 m
Spotted Kestrel *Falco moluccensis*	-
Common Sandpiper *Actitis hypoleucos*	-
Emerald Dove *Chalcophaps indicus*	Common to minimum of 400 m
Silver-tipped Imperial Pigeon *Ducula luctuosa*	Up to 200 m
Maroon-chinned Fruit Dove *Ptilinopus subgularis mangoliensis*	Common by voice to 1,100 m although shy and affording few good views
Black-naped Fruit Dove *P. melanospila chrysorrhoa*	Common to 1,100 m
Grey-cheeked Green Pigeon *Treron griseicauda*	Common to *c.*250 m
Yellow-and-green Lorikeet *Trichoglossus flavoviridis flavoviridis*	Common to 1,100 m
Golden-mantled Racquet-tail *Prioniturus platurus sinerubris*	Up to 1,100 m, common higher up
Moluccan King Parrot *Alisterus amboinensis sulaensis*	A few sightings at 0–700 m
Black-billed Koel *Eudynamys melanorhynchus*	Not seen, only heard twice
Great Eared Nightjar *Eurostopodus macrotis macropterus*	Common in lowlands
Sulawesi Nightjar *Caprimulgus celebensis jungei*	Brief sighting at 50 m; vocalisations (similar to those of nominate race) heard twice
Glossy Swiftlet *Collocalia esculenta*	-
White-throated Needletail *Hirundapus caudacutus*	1+1
Ruddy Kingfisher *Halcyon coromanda sulana*	A few sightings to 500 m
Collared Kingfisher *H. chloris*	1–2 at 50 m
Sacred Kingfisher *H. sancta*	3–4 at sea level
Variable Dwarf Kingfisher *Ceyx lepidus wallacii*	Several at 0–500 m
Common Dollarbird *Eurystomus orientalis*	2–3 at 50 m
Rainbow Bee-eater *Merops ornatus*	-
Grey Wagtail *Motacilla cinerea*	Common
Pacific Swallow *Hirundo tahitica*	-
Sula Cicadabird *Coracina sula*	Common at 0–1,100 m
Sulawesi Triller *Lalage leucopygialis*	Common up to 100 m in degraded habitat
Slender-billed Crow *Corvus enca mangoli*	Common to 150 m in degraded habitat
Arctic Warbler *Phylloscopus borealis*	Heard and seen in lowlands until 9 April
Henna-tailed Jungle Flycatcher *Rhinomyias colonus colonus*	A few sightings, mostly in bamboo, to 200 m
Grey-streaked Flycatcher *Muscicapa griseisticta*	Common to 1,100 m
Little Pied Flycatcher *Ficedula westermanni*	*c.*900–1,100 m
Common Golden Whistler *Pachycephala pectoralis clio*	Common 0–1,100 m
Ivory-backed Woodswallow *Artamus monachus*	A few sightings near the coast
Bare-eyed Myna *Streptocitta albertinae*	2+1; only in emergent trees in agricultural plantations
Moluccan Starling *Aplonis mysolensis sulaensis*	Common in the lowlands
Helmeted Myna *Basilornis galeatus*	Common and seen daily up to 1,100 m
Brown-throated Sunbird *Anthreptes malacensis extremus*	-
Olive-backed Sunbird *Cinnyris jugularis robustirostris*	-
Black Sunbird *Leptocoma sericea auriceps*	-
Grey-sided Flowerpecker *Dicaeum celebicum sulaense*	Common at 0–1,100 m
Black-faced Munia *Lonchura molucca*	-

Threatened (Birdlife International 2009), but might merit upgrading to Vulnerable or even Endangered based on such potentially steep rates of decline throughout its range.

WHITE-THROATED PIGEON *Columba vitiensis halmaheira*
An adult was observed in logged forest at *c.*900 m and a captive bird held by villagers in Binadesa was photographed. The latter had been collected as a chick at an unknown location. Although the species was known from Taliabu (White & Bruce 1986, Coates & Bishop 1997), there was no previous information on its elevational range.

SULAWESI BLACK PIGEON *Turacoena manadensis*
Common in degraded orchards and secondary forest in the lowlands to 500 m, which constitutes a slight extension of its elevational range on Taliabu, as previous records were unavailable above *c.*300 m (Davidson *et al.* 1991).

BROWN CUCKOO-DOVE *Macropygia amboinensis sedecima*
Represented on the Sula Islands by an endemic subspecies (*sedecima*), which closely resembles Sulawesi *M. a. albicapilla* (White & Bruce 1986, Coates & Bishop 1997). Common to *c.*1,100 m in a range of forest habitats. Previous records of this subspecies have all been from below *c.*300 m (Davidson *et al.* 1991), thus my records considerably extend this taxon's elevational range.

GREEN IMPERIAL PIGEON *Ducula aenea sulana*
Common to *c.*1,000 m in a range of forest habitats. The local taxon *D. a. sulana* is restricted to the Banggai and Sula groups but closely resembles Sulawesi *D. a. paulina* (White & Bruce 1986, Coates & Bishop 1997). Davidson *et al.* (1991) recorded it below *c.*400 m on Taliabu, thus my records constitute a considerable elevational extension.

WHITE-BELLIED IMPERIAL PIGEON *Ducula forsteni*
Common from sea level to at least 1,100 m in secondary logged forest to undisturbed forest, although it tended to be much commoner in the latter. Above 800 m, the species was extremely abundant in the afternoons, with up to 80 seen in flight together. Previous records from Taliabu were not made above 200 m (Davidson *et al.* 1991). My records indicate that this pigeon's distribution on Taliabu is centred at higher elevations rather than near the coast.

SULA HANGING PARROT *Loriculus sclateri sclateri*
Collar's (2007) treatment of Sula Hanging Parrot *L. sclateri* as distinct from the Moluccan Hanging Parrot *L. amabilis* is adopted here. Nominate *L. s. sclateri* is endemic to the Sula Islands, whereas *L. s. ruber* occurs on the Banggai Islands. Previously published records of the nominate subspecies range up to *c.*250 m (Davidson *et al.* 1991), but I found *L. s. sclateri* common in degraded forest to at least 750 m, indicating a wider elevational range.

RUSTY-BREASTED CUCKOO *Cacomantis sepulcralis* (*virescens*?)
Seen and heard on several occasions in disturbed forest from near sea level to *c.*1,000 m. Sound-recordings were obtained twice (e.g. Fig. 3). Previous field workers have not remarked on the elevational occurrence of this species on Taliabu (Davidson *et al.* 1991, Coates & Bishop 1997). My records suggest a wide elevational distribution on Taliabu.

The taxonomy of Rusty-breasted Cuckoo *C. sepulcralis* of South-East Asia and the closely related Brush Cuckoo *C. variolosus* of the Australo-Papuan region is confusing.

White & Bruce (1986) resurrected the original treatment as two species. For a long time before—and occasionally afterwards (e.g. Payne 1997, 2005)—they were usually considered conspecific, but more recent work indicates that more than two species might be involved (e.g. Rheindt & Hutchinson 2007). Most taxa in the *C. sepulcralis / variolosus* complex possess two common vocalisation types: (1) a trisyllabic series repeated at rising frequencies, sometimes to the typical feverish pitch of *Cacomantis* cuckoos; and (2) a series of single call notes usually repeated at level frequency. Despite the general uniformity of these two vocal types across the complex, there appear to be consistent differences in their delivery among named taxa (pers. obs.). One, *C. s. aeruginosus* from the southern Moluccas (i.e. Buru and Seram), frequently utters a very distinct variant of the second call type that is superficially dissimilar from other *C. sepulcralis* vocalisations. This unusual variant was illustrated by Rheindt & Hutchinson (2007) as a series of several dozen notes—partially level and partially rising—in stark contrast to the usually shorter level call series given by *C. variolosus* and other subspecies of *C. sepulcralis*. Vocally, *C. s. aeruginosus* appears more different from the remaining taxa of this complex than other subspecies of *C. sepulcralis* are from *C. variolosus*. However, *C. s. aeruginosus* on Seram has also been heard giving the typical short and level variant of the second call type (pers. obs.; R. O. Hutchinson pers. comm.), although rate of delivery might be more rapid than in other subspecies (R. O. Hutchinson pers. comm.). A comprehensive bio-acoustic or genetic study of all major taxa, including *C. s. aeruginosus*, is urgently required to clarify their evolutionary history.

Birds on the Sula Islands were attributed to the southern Moluccan taxon *C. s. aeruginosus* by White & Bruce (1986) and Coates & Bishop (1997). If corroborated, this would be an unusual biogeographic pattern in which the Sula population is considered more akin to a taxon from the southern Moluccas rather than to neighbouring taxa on Sulawesi or the northern Moluccas. However, given the highly unusual voice of *C. s. aeruginosus* compared to Sulawesi *C. s. virescens* at least, this taxonomic arrangement can be tested in the field. Sound-recordings from Taliabu obtained by me constituted short level series' very similar in sonographic appearance and delivery timing to those of *C. s. virescens* (Fig. 3), and very unlike the long call series of *C. s. aeruginosus* (cf. Rheindt & Hutchinson 2007). Additionally, F. Verbelen (pers. comm.) obtained identical recordings in March 1997. Although it cannot be eliminated that Taliabu birds utter the long call series of *C. s. aeruginosus* at other seasons, the short call series presented in Fig. 3 does not appreciably differ from *C. s. virescens*. It could be argued that the patterns noted here are more parsimoniously explained by the affinity of Taliabu birds to *C. s. virescens* rather than to *C. s. aeruginosus*, although vocal samples from other seasons are desirable.

White & Bruce (1986) reported wintering Australian *C. variolosus* on Taliabu, making confusion with this taxon a confounding factor. While the short level series uttered by *C. variolosus* is acoustically similar to vocal type 2 in most subspecies of *C. sepulcralis* (see above), they possess a different sonographic signature with tilda-shaped (rather than hook-shaped) individual call elements (Fig. 3; see also www.xeno-canto.org/asia). Birds recorded on Taliabu do not exhibit the tilda-shaped notes characteristic of *C. variolosus*, but the hook-shaped ones of *C. s. virescens* (Fig. 3A). Moreover, the present records from as early as 5 April, and especially F. Verbelen's (pers. comm.) March records, would be unusually early for migrant *C. variolosus* this far north.

LESSER COUCAL *Centropus bengalensis javanensis*

Common in disturbed second growth, especially grassy pastures, from sea level to *c.*1,000 m. The species must have become common on Taliabu following widespread anthropogenic habitat conversion. Previously recorded only in the lowlands (Davidson *et al.* 1991), it was

found in grassy pastures in the burnt highlands during my survey. Over large areas of montane grasslands it was generally the only bird species detected, indicating that the species quickly colonises grassy habitat at any elevation and also supporting the notion that montane grasslands on Taliabu are of recent fire-induced origin, with few bird species having adapted to them.

TALIABU MASKED OWL *Tyto nigrobrunnea*

Seen twice and photographed (Fig. 4) in dense secondary bamboo thickets near Binadesa at *c.*50 m, and seen in heavily logged forest with no understorey at *c.*900 m. Its voice—a hissing sound typical of the genus—was heard but not sound-recorded at both sites. Previously recorded just twice: (1) when the holotype was collected in 1938 and (2) a sight record along a logging track in the lowlands by Davidson *et al.* (1991). *T. nigrobrunnea* is assumed to be forest-dependent and might have declined in recent decades due to habitat destruction (Davidson *et al.* 1991). However, my records suggest it can occupy second growth and bamboo thickets in the vicinity of habitation. Villagers at Binadesa know *T. nigrobrunnea* well, and frequently see and hear it nearby. My survey produced three records, despite that nocturnal surveys were discontinued following the first sighting, suggesting the species would have been recorded more frequently given appropriate effort. The lack of records by previous visitors might be attributable to its shy and nocturnal habits, or to seasonal vocal inactivity. Considered endemic to Taliabu, future work on Mangole and perhaps Sanana should reveal its presence. Given its broad elevational range in disturbed habitat, *T. nigrobrunnea* is probably not threatened. One reason that *T. nigrobrunnea* has successfully adapted to disturbed habitats could be the absence of an open-country congener. On other islands (e.g. Sulawesi) with more than one *Tyto* species, forest-dependent taxa appear unable to colonise disturbed habitats because their open-country congeners have already filled that ecological niche.

SULA SCOPS OWL *Otus sulaensis*

I follow a study by King *et al.* (submitted) in recognising Sula Scops Owl *O. sulaensis* as a species distinct from Moluccan Scops Owl *O. magicus* and Banggai Scops Owl *O. mendeni*. The rationale for this is the distinct vocalisation of *O. sulaensis* compared to *O. magicus* and—to a much lesser extent—*O. mendeni*. During my survey, the species proved common from sea level to at least 1,100 m in forest ranging from disturbed to primary. Ecological data for *O. sulaensis* is limited on account of the confused taxonomic history of *Otus* populations on the Sula Islands. Davidson *et al.* (1991) repeatedly encountered an *Otus* in forest up to 800 m, but attributed their sightings to a potentially undescribed taxon, whilst stating that '*O. m. sulaensis* [was] not recorded by the expedition'. Undoubtedly, they were confused by the highly distinct vocalisations of this owl, which do not bear any resemblance to *O. magicus*.

UNIFORM SWIFTLET *Aerodramus vanikorensis*

Several flocks, from near sea level to over 1,100 m, with the first sighting on 10 April 2009. These flocks were observed feeding over habitats ranging from palm plantations to undisturbed montane forest. Identification was unequivocal, as the birds did not exhibit any white or otherwise pale area on the rump. Special consideration was given to Moluccan Swiftlet *A. infuscatus* from the northern Moluccas as a potential confusion risk, as its pale rump is not always readily visible. However, my records involved flocks of dark-rumped birds seen in very good light from ideal observation points, often feeding side-by-side with Glossy Swiftlet *Collocalia esculenta*. The latter appeared much smaller and displayed a contrasting white belly and green to blue gloss unlike the more uniformly drab

A. vanikorensis. On several occasions *A. vanikorensis* was observed uttering a distinctive chattering vocalisation in flight, as I had heard from the species elsewhere. Mine are the first observations on the Sula Islands. The species is probably widespread there, but might have been overlooked due to difficulties in identification. It has recently been recorded on the Banggai Islands (Rheindt *et al.* submitted), indicating that its Wallacean distribution could be much more extensive than generally assumed.

GREY-RUMPED TREESWFT *Hemiprocne longipennis wallacii*
Common in a range of secondary forest and agricultural habitats from sea level to *c.*800 m, with large flocks regular at a logging camp at 800 m in heavily logged forest, where the species might breed. Davidson *et al.* (1991) reported it from the lowlands of Taliabu, but the species is clearly more extensively distributed over the island.

RED-BELLIED PITTA *Pitta erythrogaster dohertyi*
Only three visual encounters during the survey, but it was commonly heard to at least 600 m. *P. e. dohertyi* has adapted to heavily disturbed secondary forest and bamboo thickets, albeit at presumably reduced densities, and was often heard in bamboo around Binadesa. Previous records from Taliabu were all from below 200 m (Davidson *et al.* 1991), thus my records indicate a wider elevational range. I follow White & Bruce (1986), Coates & Bishop (1997) and Erritzoe (2003) in considering *P. e. dohertyi* from the Sula and Banggai islands as a race of Red-bellied Pitta *P. erythrogaster*, but it has been treated specifically, as Sula Pitta *P. dohertyi*, by Sibley & Monroe (1990), Davidson *et al.* (1991) and Lambert & Woodcock

Legends to figures on opposite page

Figure 2. Meyer's Goshawk *Accipiter meyerianus*, Taliabu, April 2009 (F. E. Rheindt)

Figure 3. Sonogram of the calls of Rusty-breasted Cuckoo *Cacomantis sepulcralis* and Brush Cuckoo *C. variolosus* from various parts of their range. X-axis = time in seconds (0.5 seconds per tick), y-axis = frequency in kHz (2 kHz per tick). All three sonograms are at identical scale. A: *C. sepulcralis* (probably *virescens*) Taliabu (1,000 m), by F.E. Rheindt; B: *C. s. virescens* Lore Lindu National Park (central Sulawesi), by D. Farrow (source: www.xeno-canto.org/asia); C: *C. variolosus* Roti Island (Nusa Tenggara), by Colin Trainor (source: www.xeno-canto.org/asia).

Figure 4. Taliabu Masked Owl *Tyto nigrobrunnea*, Taliabu, April 2009; note the dark suffusion to the facial mask (F. E. Rheindt)

Figure 5. Island Thrush *Turdus poliocephalus*, at 1,050 m on Taliabu, April 2009; note the uniformly dark head and belly that set it apart from neighbouring *T. p. deningeri* from Seram (which has a pale head) and various taxa on Sulawesi (which have reddish belly tones) (F. E. Rheindt)

Figure 6. Sonograms of vocalisations of *Bradypterus* bush warblers. X-axis = time in seconds (0.5 seconds per tick), y-axis = frequency in kHz (2 kHz per tick). All sonograms are at identical scale. (A) 'Taliabu' Bush Warbler *Bradypterus* sp. by F. E. Rheindt (April 2009, Taliabu); (B) Benguet Bush Warbler *B. seebohmi* by R. O. Hutchinson (February 2007, Mount Polis, Luzon, Philippines); (C) Russet Bush Warbler *B. mandelli* by D. Farrow (no date, Thailand, source: www.xeno-canto.org/asia); (D) Chestnut-backed Bush Warbler *B. c. castaneus* by P. Noakes (September 2006, Lore Lindu, central Sulawesi; source: www.xeno-canto.org/asia); (E) Chestnut-backed Bush Warbler *B. c. musculus* by R. O. Hutchinson (September 2006, Kobipoto Ridge, Seram). Dark areas below 5 kHz in sonogram A are mechanical sound pollution from equipment. Note that the undescribed Taliabu birds (A) more closely resemble *B. mandelli* (C) in terms of frequency (centred around 6 kHz), and resemble *B. mandelli* (C) and *B. seebohmi* (B) in exhibiting a single repeated call element, as opposed to the *B. castaneus* complex (D, E) whose vocalisations involve 2–3 call elements given in rapid succession. In acoustic impression, Taliabu birds are most similar but not identical to *B. mandelli*.

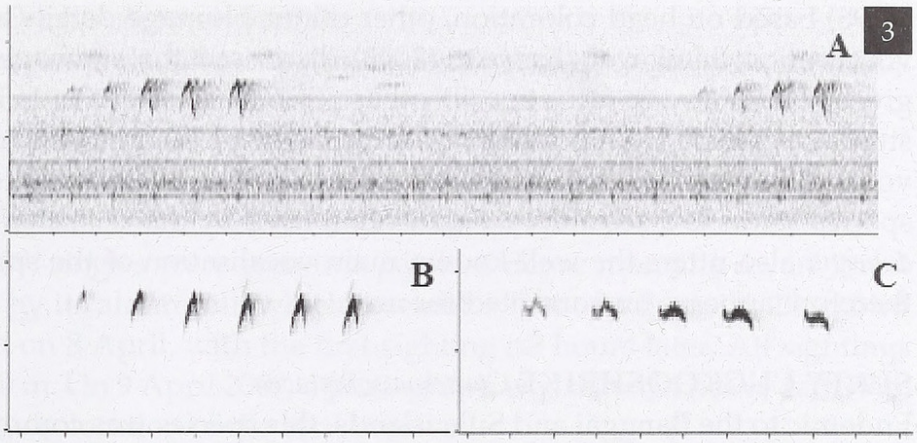
Figure 7. Undescribed taxon belonging to the Island Leaf Warbler *Phylloscopus poliocephalus* complex; note the all-yellow underparts (including throat). Colours have not been modified using photo-editing software; even so, the underparts of this individual appear especially yellow in comparison to most others seen on Taliabu during the survey (F. E. Rheindt)

Figure 8. Mountain White-eye *Zosterops montanus*, Taliabu, April 2009; note the white or pale grey belly that aligns this population with the nominate subspecies (F. E. Rheindt)

Figure 9. Adult male Sulawesi Myzomela *Myzomela chloroptera*, Taliabu, April 2009; note the lack of apparent plumage differences from the populations on Sulawesi (by F. E. Rheindt)

2

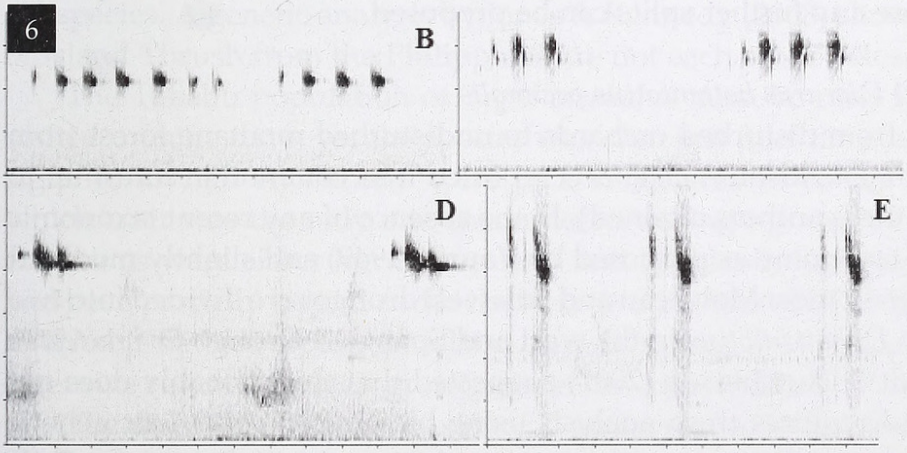
3



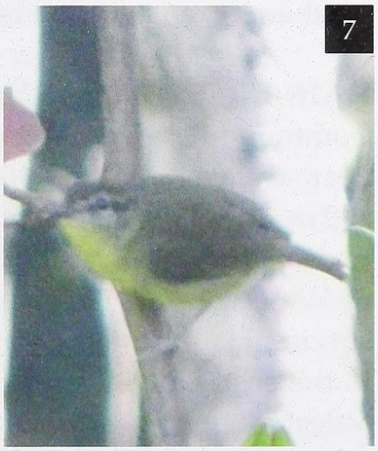
4

5

6



7



9

8

(1996) based on head coloration, other minor plumage details and an allegedly distinctive vocalisation. However, Erritzoe (2003) dismissed the plumage differences as insufficient given that plumage variation in other *P. erythrogaster* taxa is considerable. Furthermore, studies of the Banggai population of *P. e. dohertyi* (Rheindt *et al.* submitted) suggest that the vocalisation cited by Lambert & Woodcock (1996) as evidence for elevating *P. e. dohertyi* to species status is a secondary vocalisation used by many *P. erythrogaster* taxa, and that *P. e. dohertyi* also utters the well-known main vocalisation of the species. Splitting *P. e. dohertyi* therefore appears unwarranted for now.

SLATY CUCKOOSHRIKE *Coracina schistacea*
Endemic to the Banggai and Sula islands, this species was common from near sea level to at least 1,100 m, especially in degraded and logged montane forest, but also in disturbed forest at lower elevations, often accompanying its endemic congener Sula Cicadabird *Coracina sula*. My records extend the elevational range on Taliabu from that reported by Davidson *et al.* (1991) and demonstrate that the species might be commoner at higher elevations.

NORTHERN GOLDEN BULBUL *Thapsinillas longirostris longirostris*
Common in most degraded and undisturbed habitats from near sea level to at least 1,100 m. Davidson *et al.* (1991) recorded it up to 800 m on Taliabu, but they did not ascend any higher than this. Photographs and sound-recordings made during my survey should assist future workers to elucidate the confused taxonomy of the Golden Bulbul complex. I follow Fishpool & Tobias (2005) and Rheindt & Hutchinson (2007) in considering taxa from the northern Moluccas, Sangihe, Sula, Banggai and Togian islands as a species, *T. longirostris*, distinct from taxa in the southern Moluccas. The taxon on the Sula Islands is *T.l. longirostris*. Preliminary comparisons of sound-recordings made during various visits to northern Wallacea suggest that *T. longirostris* might comprise several species, given consistent differences in their plumage and vocals, akin to the differences shown between taxa that comprise Fishpool & Tobias's (2005) Southern Golden Bulbul *T. affinis* (Rheindt & Hutchinson 2007). However, a comprehensive bio-acoustic or genetic analysis of all these northern taxa is needed before any further splits can be proposed.

HAIR-CRESTED DRONGO *Dicrurus hottentottus pectoralis*
Common in varied habitats, from disturbed orchards to undisturbed montane forest from near sea level to over 1,100 m. Davidson *et al.* (1991) reported it as common in forest up to 800 m (the highest elevation these authors attained). In the absence of any recent taxonomic revision, I follow traditional taxonomy as proposed by Vaurie (1949) and slightly modified by White & Bruce (1986), wherein most Moluccan and Sulawesi drongos are divided into two species, Hair-crested Drongo *D. hottentottus* in the west and Spangled Drongo *D. bracteatus* in the east. However, Rheindt & Hutchinson (2007) suggested that this probably does not reflect true species limits and requires fresh analysis using bio-acoustic and / or genetic data. More detailed work is especially relevant in respect of the endemic Sula taxon *D. h. pectoralis*, which is considered part of the same species as neighbouring *D. h. leucops* from Sulawesi, despite being much smaller and differing greatly in iris colour and vocalisations (Coates & Bishop 1997; pers. obs.). In appearance, *D. h. pectoralis* appears relatively distinct for a drongo and more closely resembles *D. bracteatus* taxa from the Moluccas than its Sulawesi neighbour (Coates & Bishop 1997). Molecular analysis might reveal *D. h. pectoralis* to represent a genetically distinct lineage that merits treatment at species level.

BLACK-NAPED ORIOLE *Oriolus chinensis frontalis*
Represented on the Banggai and Sula islands by an endemic race, *O. c. frontalis*, previous Sula records were all from below 300 m on Taliabu (Davidson *et al.* 1991), yet I found *O. c. frontalis* common in degraded and logged forests and orchards to *c.*800 m.

ISLAND THRUSH *Turdus poliocephalus* (undescribed subspecies)
On 8, 9, 14 and 15 April 2009, singles were seen in a patch of dense montane dwarf forest at *c.*1,050 m. Initially noted by its alarm call, which resembles that of a Eurasian Blackbird *Turdus merula*, around noon on 8 April, with the first sighting *c.*3 hours later. All sightings were made in a radius of 200 m. On 9 April 2009, a photograph was taken in heavy rain (Fig. 5), which shows the plumage coloration of the bird involved.

This is the first record of Island Thrush *T. poliocephalus* from the Sula Islands, despite that it is widespread on numerous islands in the Australo-Pacific region, where it is generally—but not always—restricted to dwarf forest at the treeline or in alpine bushland and grassland above this (Clement & Hathway 2000, Collar 2005). The geographically most proximate subspecies of *T. poliocephalus* to Taliabu are *T. p. deningeri* from Seram and *T. p. hygroscopus* and *T. p. celebensis* from south-west and south Sulawesi, respectively. However, the two Sulawesi taxa are complemented by two more potential subspecies from central and eastern Sulawesi as yet undescribed (White & Bruce 1986, Coates & Bishop 1997, Collar 2005). The Island Thrush complex is not only characterised by substantial morphological variability, but also by a leapfrogging pattern in which taxa with allied plumage traits are irregularly distributed (Collar 2005). From Fig. 5, it is evident that the population on Taliabu does not resemble any of its close neighbours, its head being uniformly dark (not pale grey as in *T. p. deningeri* on Seram) and its underparts lacking any of the reddish tones of the taxa from Sulawesi. Thus, the Taliabu population warrants subspecific recognition once specimens have been collected. Although several geographically distant races from as far afield as the Philippines and New Guinea resemble the new population in plumage (Collar 2005), its closest affinities can only be determined genetically, as the dark ventral and head plumage exhibited by Taliabu birds might be an ancestral character lost in neighbouring subspecies. A genetic analysis by Jones & Kennedy (2008) showed that several similar races of Island Thrush from the Philippines are not each other's closest relatives.

The Taliabu population of *T. poliocephalus* must be rare. Appropriate elevations were visited on nine days, yet the species was seen just four times and heard a few more. More significantly, all encounters were in a small area of dwarf montane forest at 1,050 m, which tract was the only one encountered during my survey. Other areas at appropriate elevations were either burnt grassland and bushland, resulting from recent forest fires, or had been partially logged and lacked a true understorey. Although *T. poliocephalus* is known to inhabit natural alpine grassland elsewhere (e.g. New Guinea), it does not occur in the extensive recently created grasslands in the highlands of Taliabu.

The discovery of a new taxon of *T. poliocephalus* on Taliabu indicates that other islands might also hold new populations of this species. As *T. poliocephalus* usually occurs near the treeline or higher, it is often under-recorded by ornithologists, many of whom do not ascend sufficiently high during surveys. If *T. poliocephalus* occurs at just over 1,000 m on Taliabu, other Wallacean islands with even higher elevations could harbour habitat suitable for the species. Future searches should concentrate on Halmahera and its satellites (such as Bacan and Obi) or Buru. Higher mountains in the interior of Buru have long been neglected by ornithologists but were visited recently by an ornithological expedition (Rheindt & Hutchinson 2007) that did not quite attain altitudes suitable for *T. poliocephalus*, whilst the

highlands of Halmahera, Bacan and Obi are notoriously under-studied despite the large number of recreational birdwatchers visiting Halmahera in pursuit of its lowland species.

'TALIABU BUSH WARBLER' *Bradypterus* sp.

On 9 April 2009, following a long heavy rain shower, an unfamiliar vocalisation reminiscent of Russet Bush Warbler *Bradypterus mandelli* was briefly heard from a patch of dense montane dwarf forest at *c.*1,050–1,100 m. The vocalisation was instantly recognised as a *Bradypterus*, a montane genus not previously recorded on the Sula Islands. It was not heard again that day, but a few days later, and after searching other (fire-impacted) highland sites without success, I revisited the same forest on 14–15 April. Despite rain and little vocal activity, I heard this bush warbler ten more times. Song bouts were usually too short (<30 seconds) to approach the bird closely, but once on 15 April a close bird was briefly seen in the dense undergrowth. Its coloration appeared typical of the genus, brown with a well-developed white supercilium. The bird appeared large, especially compared to Chestnut-backed Bush Warbler *B. castaneus* from Sulawesi, which was seen just a few days before and after my visit to Taliabu. However, these morphological traits require confirmation. No photographs were obtained, but low-quality sound recordings were made, the best of which (Fig. 6A) was used to lure the bird that was seen.

Bradypterus is represented in northern Wallacea by the *B. castaneus* complex: *B. c. castaneus* on Sulawesi, *B. c. musculus* on Seram and *B. c. disturbans* on Buru (White & Bruce 1986, Coates & Bishop 1997). Whilst the nominate form is well known from several sites on Sulawesi, the taxa on Seram and Buru have—until recently—been almost unknown and biological data are scarce. Rheindt & Hutchinson (2007) documented the vocalisation and plumage of *B. c. musculus* from Seram and concluded that it can hardly be included in the same biological species as *B. c. castaneus*. However, due to the lack of sound-recordings and photographs of the geographically intermediate *B. c. disturbans* from Buru, they did not propose species status for *B. c. musculus*, despite that the vocalisations of *B. c. disturbans* do not sound like *B. c. castaneus* or *B. c. musculus*.

The bush warbler on Taliabu exhibits a highly distinct vocalisation typical of the genus by virtue of its insect-like quality, but acoustically distinct from any of the *B. castaneus* complex (see Fig. 6; differences from *B. c. disturbans* based on pers. obs.). In terms of frequency and structure, its song more closely resembles *B. mandelli* from the Asian mainland or one of its island offshoots, such as *B. seebohmi* from the Philippines (Fig. 6). However, this would hardly warrant placing the Taliabu birds with that species, as there are pronounced differences in element spacing and note shape between them, rendering any resemblance superficial at most (Fig. 6).

Based on the bio-acoustic evidence, this new *Bradypterus* probably deserves species status. Its evolutionary origins and genetic affinities require elucidation. The superficial resemblance to the *B. seebohmi / mandelli* complex (rather than the geographically adjacent *B. castaneus* complex) may point to its true affinities, or might be an artefact based on convergence or the retention of ancestral vocal traits. Molecular methods are required to resolve its phylogenetic relationships, and its formal description would benefit from the addition of such analysis.

'Taliabu' bush warbler must be rare. I found it in just one tract of montane dwarf forest, despite ample search effort in other areas at suitable elevations especially to find this bird. Most areas above 1,000 m accessed by me were heavily degraded with a disturbed understorey due to logging using heavy machinery. However, an even greater threat is probably posed by the recent large-scale destruction of highland forest by fire, which has accounted for *c.*70% of montane forest in the watersheds investigated during my survey

(estimated from GoogleEarth satellite imagery). Once it is formally described, this bush warbler might require Red Data listing.

MOUNTAIN TAILORBIRD *Orthotomus cuculatus* (undescribed subspecies?)
Davidson *et al.* (1991) presented the first records for the Sula Islands, and described the species as inhabiting montane forest above 500 m. I found it common in disturbed (less commonly within intact) montane forest to over 1,100 m, with a few records in dense secondary bamboo thickets down to 50 m. The species is apparently naturally absent from lowland forest but tolerates lower elevations in degraded bamboo. Davidson *et al.* (1991) considered it probable that the Taliabu birds require recognition at subspecies level. In Wallacea, *O. cuculatus* is currently subdivided into many island races, with Sulawesi possessing several races and additional unnamed populations that perhaps require taxonomic recognition, despite being generally poorly differentiated (White & Bruce 1986, Coates & Bishop 1997). It is therefore conceivable that the Taliabu birds should be named. Genetic and bio-acoustic studies should shed light on whether the current taxonomic treatment of this species in Wallacea is appropriate.

ISLAND LEAF WARBLER *Phylloscopus* [*poliocephalus*] (undescribed taxon)
Davidson *et al.* (1991) were the only previous ornithologists to find a resident population of *Phylloscopus* leaf warbler on Taliabu, which they found to be common in montane forest above 750 m and which they considered to represent an undescribed subspecies of the polytypic Island Leaf Warbler *P. poliocephalus*. During my field work, this leaf warbler was common in degraded to less-disturbed montane forest from 700 to at least 1,100 m. Poor to average photographs (e.g. Fig. 7) and good sound-recordings were obtained. Rheindt & Hutchinson (2007) asserted that the *P. poliocephalus* complex probably consists of several species-level insular taxa and presented evidence for dramatic vocal and plumage differences between two constituent taxa, *P. p. everetti* from Buru and *P. p. ceramensis* from Seram. Rheindt & Hutchinson (2007) did not propose any splits, because some relevant taxa have not yet been sampled bio-acoustically, and they recommended that taxonomic revision should be based on comprehensive vocal and / or genetic analyses of most constituent taxa. Preliminary comparison of vocal and photographic material from Taliabu with Rheindt & Hutchinson's (2007) material from Buru and Seram suggests that the Taliabu birds cannot be unambiguously assigned to either of the two southern Moluccan taxa. It is probable that future bio-acoustic analysis will reveal the Taliabu birds to form a biological species apart from the rest of the *P. poliocephalus* complex. Once specimens become available, formal description of the birds on Taliabu should be undertaken in combination with a detailed acoustic, morphological and—if possible—genetic comparison with the rest of the complex.

MOUNTAIN WHITE-EYE *Zosterops montanus* (undescribed subspecies?)
Davidson *et al.* (1991) discovered this species in montane forest on Taliabu above 800 m and speculated that it replaces the common lowland Black-fronted White-eye *Z. atrifrons sulaensis* at higher altitudes. Mountain White-eye *Z. montanus* is widespread in the Indonesian and Philippine archipelagos, and has been divided into numerous insular subspecies (Mees 1957, van Balen 2008). In Wallacea, two prominent plumage types exist: (1) yellow-bellied birds on Ternate, Tidore and Seram which are usually considered as *Z. m. obstinatus*; (2) white-bellied birds in the Lesser Sundas, Sulawesi and Buru, which are treated as nominate *Z. m. montanus* by most authors (e.g. van Balen 2008). I found *Z. montanus* common in montane forest and bushland from 750 m to over 1,100 m, with two records from 650 m. Across this

range, *Z. montanus* was commonly sympatric with *Z. atrifrons sulaensis* and was even seen in the same mixed-species flocks, although *Z. montanus* usually kept to lower vegetation. The two species therefore do not replace each other elevationally, although they do largely keep to different strata. Photographs (Fig. 8) reveal that the Taliabu population is white-bellied (or pale grey-bellied) akin to neighbouring populations on Sulawesi and Buru, making it best to attribute it to nominate *Z. m. montanus* for now. Genetic analysis might reveal that Wallacean populations currently attributed to nominate *montanus* are distinct. Since the holotype of *Z. montanus* is from Sumatra, this name would no longer apply to the subspecies in Wallacea, in which case Taliabu birds might be subsumed with either those on Buru or Sulawesi, or be recognised subspecifically, as suggested by Davidson *et al.* (1991). For now, such treatment would be premature and retention of all white-bellied Wallacean forms in the nominate subspecies appears preferable.

BLACK-FRONTED WHITE-EYE *Zosterops atrifrons sulaensis*
Davidson *et al.* (1991) found this species only in the lowlands and thought it was replaced by *Z. montanus* in montane forest. I found it common on Taliabu from near sea level to over 1,100 m, and the species is widely sympatric with *Z. montanus*, although it generally keeps to higher strata in the forest. Rasmussen *et al.* (2000) concluded that the endemic *Z. a. sulaensis* exhibits significant differences from the Sulawesi races, *Z. a. atrifrons* and *Z. a. surda*, in terms of eye-ring width and dawn song vocalisations, but stopped short of elevating *Z. a. sulaensis* to species level because of a lack of vocal data for the Banggai subspecies *Z. a. subatrifrons*, which is intermediate in plumage traits. More recently, Rheindt *et al.* (submitted) found that vocally *Z. a. subatrifrons* differs vastly from the Sula and Sulawesi taxa, thereby supporting elevation of *Z. a. sulaensis* to species level, given the lack of vocal intermediacy between birds on Sula and elsewhere.

SNOWY-BROWED FLYCATCHER *Ficedula hyperythra* (undescribed subspecies?)
One adult male in the interior of undisturbed primary montane dwarf forest at *c.*1,100 m. Discovered on Taliabu by Davidson *et al.* (1991), who recorded it in montane forest above 800 m. Its scarcity during my survey could be due to the species' unobtrusive habits, and because intact montane forest interior was difficult to access via logging tracks. Davidson *et al.* (1991) contended that the Taliabu population may warrant recognition at subspecies level. In fact, Wallacean populations are split into a variety of poorly differentiated subspecies, each endemic to its own island or even peninsula, as in various Sulawesi races (White & Bruce 1986, Coates & Bishop 1997). Before naming the Taliabu population, a genetic analysis or—at the very least—a detailed morphological and bio-acoustic investigation involving most taxa from Wallacea, and beyond, is needed.

ISLAND VERDITER FLYCATCHER *Eumyias panayensis* (undescribed subspecies?)
Common from near sea level to *c.*1,000 m. Its song—primarily given at dawn and dusk—revealed it to be common in disturbed orchards and secondary forest, although it was also found in more undisturbed montane and submontane forest. Only recently discovered on Taliabu, where Davidson *et al.* (1991) thought it largely restricted to above 800 m, with a single sighting in the lowlands. My records indicate that it is more common in the lowlands than assumed by Davidson *et al.* (1991), who might have overlooked it at lower elevations, or perhaps *E. panayensis* has recently increased due to habitat disturbance, which could have induced birds to move downslope into edge habitats.

E. panayensis is patchily distributed throughout the Philippines and northern Wallacea, occurring on most larger and random smaller islands in the region. In Wallacea four poorly

differentiated subspecies endemic to individual islands or even peninsulas, as on Sulawesi, are recognised (White & Bruce 1986, Coates & Bishop 1997). For convenience, the Taliabu population is currently assigned to *E. p. septentrionalis* from north and central Sulawesi by most authors, although Davidson *et al.* (1991) suggested that it might merit recognition as an endemic subspecies. Formal description of this population should be attempted as part of a detailed morphological and bio-acoustic analysis—potentially aided by genetic enquiry—to ascertain whether the current taxonomic treatment of this species in Wallacea is appropriate.

BLACK-NAPED MONARCH *Hypothymis azurea blasii*
This species—represented on Taliabu by *H. a. blasii* (which is endemic to the Sula and Banggai groups)—was common from near sea level to *c.*900 m in habitats ranging from orchards to undisturbed forest. Previous data on the elevational range of this subspecies exclusively refer to the lowlands, with Davidson *et al.* (1991) recording the species 'not . . . above c. 300 m'. My records considerably extend its range into the highlands.

ISLAND MONARCH *Monarcha cinerascens cinerascens*
Previous workers did not find this species on Taliabu above 200 m (Davidson *et al.* 1991), but I recorded it in degraded orchards to older secondary forest from near sea level to *c.*900 m, indicating a wider elevational range than was assumed.

RUSTY-BELLIED FANTAIL *Rhipidura teysmanni sulaensis*
Represented on the Sula Islands by the endemic *R. t. sulaensis* (White & Bruce 1986, Coates & Bishop 1997), Davidson *et al.* (1991) recorded it on Taliabu into montane forest. I encountered it from the lowlands to at least 1,100 m, and sound-recordings were obtained. Preliminary comparison of these with recordings of other *R. teysmanni* taxa and an undescribed population from the Banggai Islands suggest that *R. t. sulaensis* is vocally distinct (Rheindt *et al.* submitted).

CITRINE CANARY-FLYCATCHER *Culicicapa helianthea helianthea*
Common in degraded to undisturbed forest from the lowlands to *c.*800 m. Davidson *et al.* (1991) recorded it in ' . . . lowland forest types . . . ' only, but my survey demonstrates that its elevational range on Taliabu is wider.

DRAB WHISTLER *Pachycephala griseonota lineolata*
On the Sula Islands represented by the potentially endemic race *P. g. lineolata*. Davidson *et al.* (1991) reported it in 'lowland forest types' throughout Taliabu, but I found it common from near sea level to *c.*1,000 m. A good photograph of a female was taken at *c.*900 m, indicating that the species is by no means restricted to lowlands on Taliabu.

SULAWESI MYZOMELA *Myzomela chloroptera* (undescribed subspecies?)
I follow Salomonsen (1967), and thereafter Wolters (1979), Rheindt & Hutchinson (2007) and Higgins *et al.* (2008), in assigning species status to *M. chloroptera* from Sulawesi to the exclusion of the quite different-looking Wakolo Myzomela *M. wakoloensis*, Banda Myzomela *M. boiei* and Scarlet Myzomela *M. sanguinolenta*. Sulawesi Myzomela was first recorded on Taliabu by Davidson *et al.* (1991) who considered it a common inhabitant of montane forest above 800 m. I found the species abundant (with one photographed, Fig. 9) in montane forest to at least 1,100 m, but sporadic records were also made at tall flowering trees in the lowlands above *c.*100 m, indicating a wider elevational range than previously assumed.

Davidson *et al.* (1991) suggested that Taliabu birds might be subspecifically distinct from *M. chloroptera* on Sulawesi, but I did not notice any consistent plumage differences between them. A more detailed morphological investigation—and molecular analysis—is needed to establish whether the Taliabu population merits taxonomic recognition.

BLUE-FACED PARROTFINCH *Erythrura trichroa*

An individual apparently of this species was briefly seen in logged secondary forest at 900 m. It was initially detected giving an extremely high-pitched note, before alighting on a bare branch where it remained for no longer than one second. The tiny size, green overall colour and relatively heavy-based bill were noted, but the sighting was too brief to be conclusive. Not previously recorded on the Sula Islands, but occurrence is conceivable, given that it occurs in montane forest to the west (Sulawesi) and east (in the Moluccas: White & Bruce 1986). Future workers should look for the species on Taliabu.

Acknowledgements

I am indebted to Pak Obrin and other villagers from Binadesa for their hospitality during my stay and for guiding me to the central highlands of Taliabu. Ditta-Sofie Rheindt is thanked for financially supporting my expedition. For some comparative vocal material utilised here, I thank R. O. Hutchinson and the various recordists who have deposited their material in the Xeno-canto online sound library (www.xeno-canto.org/asia). Murray Bruce deserves warm thanks for his invaluable input that helped improve the manuscript considerably. I also thank the following (in alphabetical order) for helpful criticism of the manuscript: James A. Eaton, Robert O. Hutchinson, Guy Kirwan and Filip Verbelen.

References:

van Balen, S. 2008. Family Zosteropidae (white-eyes). Pp. 402–485 *in* del Hoyo, J., Elliott, A. & Christie, D. A. (eds.) *Handbook of the birds of the world*, vol. 13. Lynx Edicions, Barcelona.

Becker, J. J., Sandwell, D. T., Smith, W. H. F., Braud, J., Binder, B., Depner, J., Fabre, D., Factor, J., Ingalls, S., Kim, S.-H., Ladner, R., Marks, K., Nelson, S., Pharaoh, A., Sharman, G., Trimmer, R., von Rosenburg, J., Wallace, G. & Weatherall, P. 2009. Global bathymetry and elevation data at 30 arc seconds resolution: SRTM30_PLUS. *Marine Geodesy* 32: 355–371.

Bintanja, R., van de Wal, R. S. W. & Oerlemans, J. 2005. Modelled atmospheric temperatures and global sea level over the past million years. *Nature* 437: 125–128.

BirdLife International. 2009. Species factsheet: *Megapodius bernsteinii*. www.birdlife.org (accessed 5 June 2009).

Caputo, R. 2007. Sea level curves: perplexities of an end-user in morphotectonic applications. *Global & Planetary Change* 57: 417–423.

Clement, P. & Hathway, R. 2000. *Thrushes*. Christopher Helm, London.

Coates, B. J. & Bishop, K. D. 1997. *A field guide to the birds of Wallacea*. Dove Publications, Alderley.

Collar, N. J. 2005. Family Turdidae (thrushes). Pp. 514–810 *in* del Hoyo, J., Elliott, A. & Christie, D. A. (eds.) *Handbook of the birds of the world*, vol. 10. Barcelona, Lynx Edicions.

Collar, N. J. 2007. Taxonomic notes on some insular *Loriculus* hanging-parrots. *Bull. Brit. Orn. Cl.* 127: 97–107.

Davidson, P. J. & Stones, T. 1993. Birding in the Sula Islands. *Oriental Bird Club Bull.* 18: 59–63.

Davidson, P. J., Lucking, R. S., Stones, A. J., Bean, N. J., Raharjaningtrah, W. & Banjaransari, H. 1991. Report on an ornithological survey of Taliabu, Indonesia. Univ. of East Anglia, Norwich.

Davidson, P. J., Stones, T. & Lucking, R. S. 1995. The conservation status of key bird species on Taliabu and the Sula Islands, Indonesia. *Bird Conserv. Intern.* 5: 1–20.

Erritzoe, J. 2003. Family Pittidae (pittas). Pp. 106–160 *in* del Hoyo, J., Elliott, A. & Christie, D. A. (eds.) *Handbook of the birds of the world*, vol. 8. Lynx Edicions, Barcelona.

Fishpool, L. D. C. & Tobias, J. A. 2005. Family Pycnonotidae (bulbuls). Pp. 124–251 *in* del Hoyo, J., Elliott, A. & Christie, D. A. (eds.) *Handbook of the birds of the world*, vol. 10. Lynx Edicions, Barcelona.

Hall, R. 2002. Cenozoic geological and plate tectonic evolution of Southeast Asia and the southwest Pacific: computer-based reconstructions, models and animations. *J. Asian Earth Sci.* 20: 353–431.

Higgins, P., Christidis, L. & Ford, H. 2008. Family Meliphagidae (honeyeaters). Pp. 498–691 *in* del Hoyo, J., Elliott, A. & Christie, D. A. (eds.) *Handbook of the birds of the world*, vol. 13. Lynx Edicions, Barcelona.

ICBP. 1992. *Putting biodiversity on the map: priority areas for global conservation*. International Council for Bird Preservation, Cambridge, UK.

Jones, A. W. & Kennedy, R. S. 2008. Plumage convergence and evolutionary history of the Island Thrush in the Philippines. *Condor* 110: 35–44.

King, B., Sangster, G. & Yong, D. submitted. The taxonomic status of *Otus* (*magicus*) *sulaensis* and *Otus* (*m.*) *mendeni*, two poorly known scops owls from Wallacea. *Bull. Brit. Orn. Cl.*

Lambeck, K. & Chappell, J. 2001. Sea level change through the last glacial cycle. *Science* 292: 679–686.

Lambert, F. & Woodcock, M. 1996. *Pittas, broadbills and asities.* Pica Press, Robertsbridge.

Mees, G. F. 1957. A systematic review of the Indo-Australian Zosteropidae, part 1. *Zool. Verh. Leiden* 35: 1–204.

Payne, R. B. 1997. Family Cuculidae (cuckoos). Pp. 508–607 *in* del Hoyo, J., Elliott, A. & Sargatal, J. (eds.) *Handbook of the birds of the world*, vol. 4. Lynx Edicions, Barcelona.

Payne, R. B. 2005. *The cuckoos.* Oxford Univ. Press.

Rasmussen, P. C., Wardill, J. C., Lambert, F. R. & Riley, J. 2000. On the specific status of the Sangihe White-eye *Zosterops nehrkorni*, and the taxonomy of the Black-crowned White-eye *Z. atrifrons* complex. *Forktail* 16: 69–80.

Rheindt, F. E. & Hutchinson, R. O. 2007. A photoshot odyssey through the confused avian taxonomy of Seram and Buru (southern Moluccas). *BirdingASIA* 7: 18–38.

Rheindt, F. E., Verbelen, F., Putra, D. D., Rahman, A. & Indrawan, M. submitted. New biogeographic records in the avifauna of the Banggai Islands (Sulawesi), including notes on species and subspecies limits in some endemic taxa. *Bull. Brit. Orn. Cl.*

Salomonsen, F. 1967. Family Meliphagidae, honeyeaters. Pp. 338–450 *in* Paynter, R. A. (ed.) *Check-list of birds of the world*, vol. 12. Mus. Comp. Zool., Cambridge, MA.

Sibley, C. G. & Monroe, B. L. 1990. *Distribution and taxonomy of the birds of the world.* Yale Univ. Press, New Haven, CT.

Siddall, M., Rohling, E. J., Almogi-Labin, A., Hemleben, C., Meischner, D., Schmelzer, I. & Smeed, D. A. 2003. Sea-level fluctuations during the last glacial cycle. *Nature* 423: 853–858.

Stattersfield, A. J., Crosby, M. J., Long, A. J. & Wege, D. C. 1998. *Endemic Bird Areas of the world: priorities for biodiversity conservation.* BirdLife International, Cambridge, UK.

Stones, A. J., Lucking R. S., Davidson P. J. & Raharjaningtrah W. 1997. Checklist of the birds of the Sula Islands, with particular reference to Taliabu. *Kukila* 9: 37–55.

Sujatnika, Jepson, P., Soehartono, T. R., Crosby, M. J. & Mardiastuti, A. 1996. *Indonesian biodiversity: the Endemic Bird Area approach.* BirdLife International, Jakarta.

Thompson, W. G. & Goldstein, S. L. 2005. Open-system coral ages reveal persistent suborbital sea-level cycles. *Science* 308: 401–404.

Vaurie, C. 1949. A revision of the bird family Dicruridae. *Bull. Amer. Mus. Nat. Hist.* 93: 199–342.

White, C. M. N. & Bruce, M. D. 1986. *The birds of Wallacea (Sulawesi, the Moluccas and Lesser Sunda Islands, Indonesia): an annotated checklist.* British Ornithologists' Union, Tring.

Wolters, H. E. 1979. *Die Vogelarten der Erde*, bd. 4. Paul Parey, Hamburg.

Address: Harvard University, Department of Organismic and Evolutionary Biology, 26 Oxford Street, Cambridge, MA 02138, USA.