

A New Subspecies of the Island Thrush *Turdus poliocephalus* from Tolokiwa Island in the Bismarck Archipelago

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The Island Thrush *Turdus poliocephalus* is widely distributed on Pacific islands from Sumatra, Formosa and Christmas Island in the west to Fiji and Samoa in the east. In the western half of its range east to the Solomons it is confined to the mountains of high, species-rich islands, except for sea-level populations on the low islands of Christmas, St. Matthias and Rennell. However, it regularly occurs at sea level on the species-poor islands, both high and low ones, from the New Hebrides eastwards. A few decades ago its distribution on the mountainous islands east of New Guinea to the Solomons appeared patchy. Subsequent discoveries of populations in the mountains of Karkar (Diamond & LeCroy 1979), Tokokiwa (Diamond 1976), New Britain (K.D. Bishop pers. comm.), New Ireland (Ripley 1977; Beehler 1978) and Guadalcanal (Cain & Galbraith 1955)

showed *T. poliocephalus* to occur on every northern Melanesian island exceeding 1400 m in elevation except Umboi (Fig. 1).

From island to island, and from mountain range to mountain range on large islands (Sumatra, Java, Luzon, Mindanao, Celebes, Timor and New Guinea), *T. poliocephalus* exhibits marked geographic variation in colour pattern, darkness and size. The most recent summary (Ripley 1964) recognised 50 subspecies, many of them highly distinctive, and one more subspecies was subsequently named (Ripley 1977). In analysing the birds I collected on Tolokiwa Island in the Bismarck Archipelago, I found that its Island Thrush population, whose existence I reported previously (Diamond 1976), also belongs to a

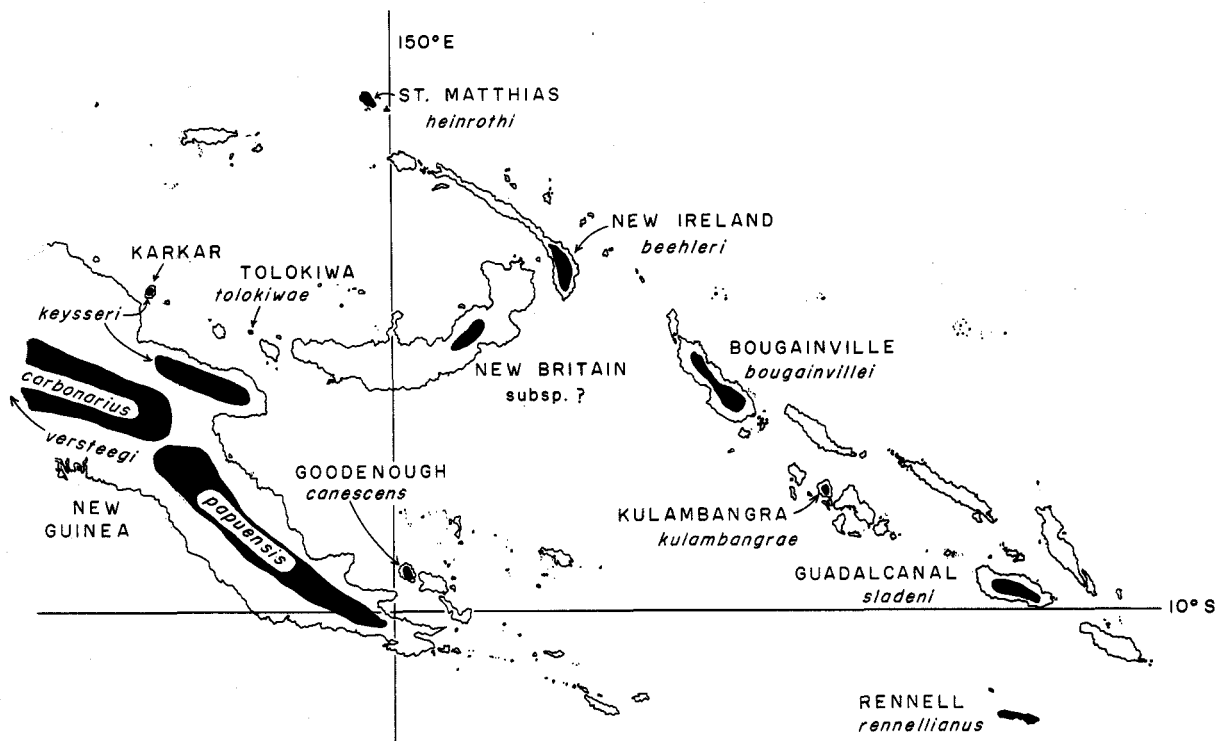


FIGURE 1 Distribution of *Turdus poliocephalus* in Northern Melanesia and eastern New Guinea. Geographic names are in upper-case Roman letters, while subspecies names are in lower-case italics.

new subspecies, which I name *Turdus poliocephalus tolokiwae*. The Tolokiwa population was fairly common in the forest understorey from 750 m to Tolokiwa's summit at 1420 m. As holotype I choose an adult male with moderately enlarged testes, field number 2810, AMNH catalogue no. 818431, wing 109 mm, weight 60 g, that I mist-netted on 16 August 1972 at an altitude of 1300 m. I compared my Tolokiwa series in the American Museum of Natural History with specimens of 45 of the 51 previously recognised races.

Adult males of *tolokiwae* are a uniform dull dark grey-brown dorsally, slightly lighter ventrally with inconspicuous lighter edges on the lower belly and under tail coverts. Adult females are slightly lighter than males, and the edges on the lower belly and under tail coverts are broader and more ochraceous. Three immature males (wings 104, 105, and 106 mm; weights 62, 57, and 60 g respectively) have ochraceous tips to the wing coverts, scattered ochraceous tips ventrally, scattered ochraceous feathers on the superciliary and ear, and ochraceous shaft streaks on the nape. In all individuals the legs, bill and bare skin of the eyelid were yellow-orange and the iris brown.

The Tolokiwa population differs from all other populations of New Guinea, the Bismarcks and Solomons in its

greyer, less brown colour. In this respect it approaches the race *malekulae* on Malekula of the New Hebrides. This distinctive greyiness of the Tolokiwa series cannot be an artifact of foxing of older material used for comparison, because the Tolokiwa specimens (collected in 1972) differ in this respect from Karkar and Huon Peninsula specimens of the race *keysseri* collected within the same decade (1969 and 1964, respectively) and because specimens of *malekulae* collected in 1926 still looked grey in 1987. In its relatively uniform colouration *tolokiwae* differs from all four New Guinea races (*versteegi*, *carbonarius*, *keysseri* and *papuensis*), in which the throat and breast are paler than the rest of the body; from the Goodenough race (*canescens* described as having a pale grey head contrasting with the dark brown body); and from one of the two other Bismarck races *beehleri* (described as having an indistinct pattern on the head and throat: Ripley 1977). The other Bismarck race (*heinrothi*) and all four Solomon races (*bougainvillei*, *kulambangrae*, *sladeni* and *rennellianus*) resemble *tolokiwae* in their relatively uniform colouration. Most populations east of the Solomons or west of New Guinea have distinctive colour patterns, such as white heads, white vents or ochraceous bellies.

In size (Table 1), *tolokiwae* is much smaller than the four New Guinea races, larger than *beehleri* and two of the four

TABLE 1 Wing length and weight of *Turdus poliocephalus* adults.

		Wing		Weight	
		♂	♀	♂	♀
New Guinea					
<i>versteegi</i>	Snow Mts	136-144.5 (n = 5) ^a	135.5-136 (n = 3) ^a	—	—
<i>carbonarius</i>	Central Highlands	124.5 ^a	122.5-125 (n = 4) ^a	—	—
<i>keysseri</i>	Huon Peninsula	118 ^c , 119, 124 ^b	118 ^b , 119 ^b , 119, 120	69 ^b , 72 ^b	71 ^b , 71 ^b
<i>keysseri</i>	Karkar	122, 122, 123	—	71, 78	—
<i>papuensis</i>	south-east New Guinea	127-135 (av. 132, n = 9) ^c	126-129 (av. 127, n = 7) ^c	74, 80	77, 80
Bismarck Archipelago					
<i>tolokiwae</i>	Tolokiwa	107-114 (av. 110.3, n = 6)	104-112 (av. 107.2, n = 13)	52-63 (av. 59.7, n = 6)	54-67 (av. 60.9, n = 10)
<i>heinrothi</i>	St. Matthias	110	—	—	—
<i>beehleri</i>	New Ireland	104 ^d , 105 ^d	97 ^d	47.8 ^d , 52.5 ^d	44, 49.5 ^d
Solomon Archipelago					
<i>bougainvillei</i>	Bougainville	105-115 (av. 111.1, n = 10)	103-110 (av. 106.7, n = 7)	—	—
<i>kulambangrae</i>	Kulambangra	104, 105	—	—	—
<i>sladeni</i>	Guadalcanal	107 ^e , 110 ^e	—	57 ^e , 59 ^e	—
<i>rennellianus</i>	Rennell	99-107 (av. 103.3, n = 23)	96-104 (av. 101.3 n = 9)	52-61.5, (av. 56.9, n = 16) ^f	57-67, (av. 63, n = 4) ^f

Wing measurements and weights are my own, except as follows: a = Mayr & Gilliard (1951); b = Mayr (1931); c = Mayr & Rand (1937); d = Ripley (1977) and Beehler (1978); e = Cain & Galbraith (1955); f = taken from specimen labels in the American Museum of Natural History.

Solomon races (*kulambangrae* and *rennellianus*) and comparable to the other two Solomon races (*bougainvillei* and *sladeni*) and to the unique type of *heinrothi*. *T. p. tolokiwae* is less dark than the darkest New Guinea race (*versteegi*) or *kulambangrae* and *rennellianus*, and it must also be less dark than *sladeni*, of which I saw no adults but which was described as similar in darkness to *kulambangrae* (Cain & Galbraith 1955). However, *tolokiwae* is darker than *bougainvillei* or *heinrothi*. On the basis of size and relatively uniform colouration, the nearest relatives of the Tolokiwa population are the other populations of the Bismarcks and Solomons, as one would expect on geographic grounds.

T. poliocephalus exhibits striking inter-island variation in its altitudinal range: (see Fig. 42 of Diamond 1975). Its altitudinal floor increases with an island's area, elevation, species richness and proximity to colonising sources. For example, its floor is c. 2750 m on New Guinea and lies variously at between 750 and 1500 m on New Ireland (1500 m), Bougainville (1200 m), Guadalcanal (1200 m), Karkar (1175 m), Kulambangra (1040 m) and Tolokiwa (750 m), but it occurs at sea level on Christmas Island, St. Matthias, Rennell and islands from the New Hebrides eastwards. The effect of this variation in altitudinal floor is that *T. poliocephalus* is confined to bird communities with no more than about 30 species (range 23-36, average value 31, for ten islands), suggesting that this thrush is unable to compete in richer communities. On large, species-rich islands like New Guinea, the decline in species diversity with elevation yields forest communities of 30 or fewer bird species only above 2750 m but this diversity is encountered closer to sea level on progressively smaller, more remote islands. The altitudinal range of *T. p. tolokiwae* fits this trend, because Tolokiwa supports 40 species at sea level but only 23 species at the altitude (750 m) at which *T. p. tolokiwae* first appears.

Body size of birds and other animals often tends to increase intra-specifically with altitude, a trend termed the Bergmann effect. Comparison of the inter-island differences in altitudinal range (preceding paragraph) and size (Table 1) of *T. poliocephalus* shows parallels, suggesting that some of the inter-island variation in size is due to the Bergmann effect. Thus, the largest populations (greatest weight and wing length) are those of New Guinea and the high islands to the west, where *T. poliocephalus* is confined

to high elevations. The populations of Tolokiwa, Bougainville and Guadalcanal, living at middle elevations, are smaller, while those living at sea level on Christmas Island, Rennell and the New Hebrides are smaller still. However, the Bergmann effect cannot provide the whole explanation for inter-island size variation: the Karkar *keysseri* population living at an altitude only slightly higher than that of the Tolokiwa population is much larger, the Kulambangra population at nearly the same altitude is smaller, the New Ireland population at a higher altitude is smaller and the sea-level populations on St. Matthias and some Fijian islands are equal to *tolokiwae* in size.

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References

- Beehler, B. (1978). Notes on the mountain birds of New Ireland. *Emu* 78, 65-70.
- Cain, A.J. & Galbraith, I.C.J. (1955). Five new subspecies from the mountains of Guadalcanal (British Solomon Islands). *Bull. Br. Ornithol. Club* 75, 90-93.
- Diamond, J.M. (1975). Assembly of species communities. In: *Ecology and Evolution of Communities* (eds M.L. Cody & J.M. Diamond) pp. 342-444. Harvard University Press, Cambridge, Massachusetts.
- Diamond, J.M. (1976). Preliminary results of an ornithological exploration of the islands of Vitiaz and Dampier Straits, Papua New Guinea. *Emu* 76, 1-7.
- Diamond, J.M. & LeCroy, M. (1979). Birds of Karkar and Bagabag Islands, New Guinea. *Bull. Am. Mus. Nat. Hist.* 164, 467-531.
- Mayr, E. (1931). Die Vögel des Saruwaged- und Herzoggebirges (NO-Neuguinea). *Mitt. Zool. Mus. Berl.* 17, 639-723.
- Mayr, E. & Gilliard, E.T. (1951). New species and subspecies of birds from the highlands of New Guinea. *Am. Mus. Novit.* no. 1524.
- Mayr, E. & Rand, A.L. (1937). Results of the Archbold Expeditions. 14. Birds of the 1933-1934 Papuan Expedition. *Bull. Am. Mus. Nat. Hist.* 73, 1-248.
- Ripley, S.D. (1964). Subfamily Turdinae, Thrushes. In: *Checklist of Birds of the World*, Vol. 10 (eds E. Mayr & R.A. Paynter) pp. 13-227. Mus. Comp. Zool., Cambridge, Massachusetts.
- Ripley, S.D. (1977). A new subspecies of Island Thrush, *Turdus poliocephalus*, from New Ireland. *Auk* 94, 772-773.