

# Santo

## The Natural History of

edited by  
Philippe Bouchet, Hervé Le Guyader, Olivier Pascal



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# Santo

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**Philippe Bouchet, Hervé Le Guyader & Olivier Pascal**



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# The Vertebrates of Santo

## TERRESTRIAL BIRD COMMUNITIES

Nicolas Barré, Thibaut Delsinne & Benoît Fontaine

The avifauna of Vanuatu plays an important role in the understanding of south Pacific biogeography, and has been the subject of attention from scientists and ornithologists since the end of the nineteenth century. Several expeditions during the beginning of the twentieth century improved our knowledge. In 1945 Mayr published the first comprehensive list which was subsequently confirmed by Medway and Marshall in 1975, and more recently by Bregulla in 1992. Santo, the largest (3959 km<sup>2</sup>) and highest (1879 m) island of the archipelago has diverse, mostly forested habitats and has received special attention by all these authors. Thus the objectives of the Santo 2006 expedition were focused more on determining bird distribution, habitat preference, conservation status, and where possible community composition.

### Material and methods

The terrestrial component of the Santo 2006 expedition took place in October-December 2006, the austral spring and the breeding season for most species when the birds are most active, thus making their detection easier. Despite occasional observations of sea, coastal and wetland birds, we focused our attention on terrestrial birds and have restricted this note to these birds. The three authors each spent a total of about one month on Santo, they belonged to three different scientific teams of the Expedition, and worked independently in both the same and different sites on the island. Altogether, 74 days were dedicated to bird record and observation. The survey sites (Table 18 & Fig. 203) were clustered in five classes reflecting a decreasing degree of human disturbance from urban areas to native forests, and increasing elevation, from sea level to the highest sites surveyed at the top of the Cumberland range. The names of the sites are reported, as well as the surveying effort (i.e. number of days spent at each habitat class, number of survey sites and number of surveys for each habitat classes).

Effort was not related to habitat class: nine days in Luganville, a small town of c. 3 km length waterfront,

compared with 12 days in the higher mountains. The habitats may be highly diverse especially at low/medium elevation, in sites impacted by humans. Large patches of natural dry/semi-humid forests remain, with secondary forests where logging or clearing has occurred, with Melanesian gardens, old coconut plantations and pastures. This is particularly true at low elevation in the southern part of the island and especially in Luganville and Saraoutou area. Luganville suburbs themselves are immediately in contact, without transition, with these diverse habitats. Small private gardens, open fallow lands, parks and riverside vegetation in the town are replaced rapidly at the periphery by a heterogeneous agricultural landscape dominated by pastures, coconut plantations and patches of forest. Medium elevation (100-300 m) sites are less complex, large pastures and coconut plantations were usually absent or occupied only a limited area. Such sites have considerable habitat diversity, although dominated by different forest types and forest birds can potentially be found

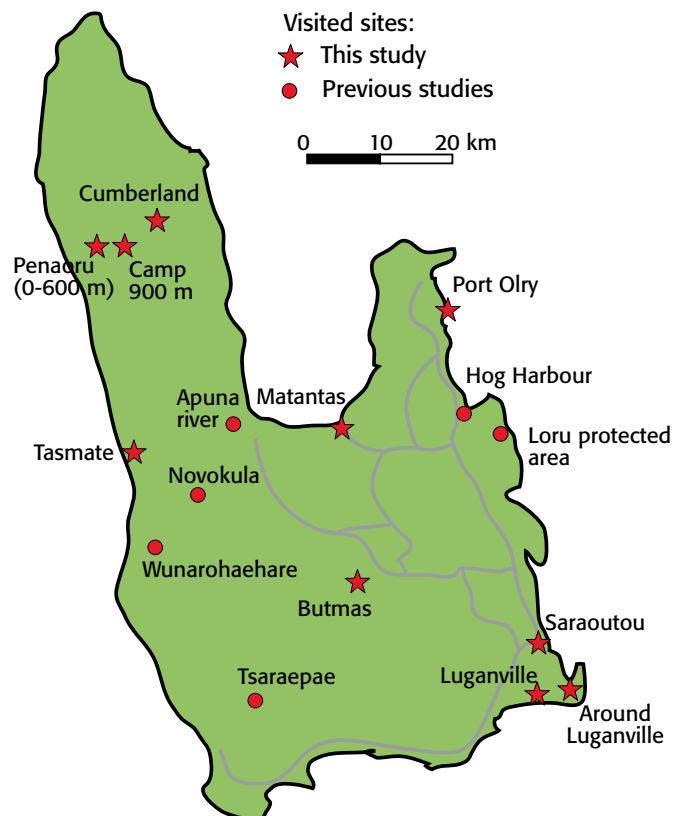


Figure 203: Survey sites of bird communities.

Table 18: Survey sites, description and effort

(Note: Numbers in brackets include surveys by others, in sites in italic characters in the Locality column – refer text)

Habitat Type	Description	Altitude	Days	Sites	Surveys	Localities
Urban site	Urban	Low elevation (0-30 m)	9(9)	1(1)	3(3)	Luganville
Secondary lowland sites	Villages, cultures, pastures, coconut plantations, clearings, secondary forests, coastal dry forests	Low elevation (0-60 m)	31(36?)	5(6)	6(7)	Saraoutou, Tasmate, Port Olry, Matantas, Penaoru, <i>Loru</i>
Secondary medium elevation sites	Villages, traditional gardens, clearings, primary (most) and secondary forests	Medium low elevation (100-300 m)	14(22)	2(4)	4(6)	Butmas, Penaoru, <i>Apuna, Hog harbour</i>
Primary medium elevation forests	Wet primary forests on slopes and hills	Medium-high elevation (600 m)	8(15)	2(3)	3(4)	Butmas (hills), Penaoru (slopes), <i>Tsaraepae</i>
Primary mountain forests	Wet primary mountain forests and ridges	High elevation (900-1 200 m)	12(20)	1(3)	4(6)	Penaoru, Cumberland, <i>Wunaroahare Nokovula</i>
<b>TOTAL</b>			<b>74(102?)</b>	<b>11(17)</b>	<b>20(26)</b>	

in all sites. High elevation habitats (600-1 200 m) consist mainly in well preserved or lightly disturbed forests. Vegetation is described in "Vegetation and Flora" in this book.

In order to increase the data set, we have included data collected, mainly in the southwestern part of Santo, by:

- Medway and Marshall in 1975 who spent four days at each of the following sites: Apuna River (altitude 100 m), Hog Harbor (160 m), Nokovula (1 120 m);
- Kratter and coauthors in 2006 who mist-netted seven days at Tsaraepae (5-700 m) and four days at Wunaroahare (600-1 200 m);
- Bowen in 1997 who visited the Loru protected area (0-120 m) for several (five?) days (Fig. 203).

Most of these studies were made in September-November. In table 18, we indicate in brackets the total time and the number of sites and prospectations for each of the five major habitat types prospected.

Since inventory methods and survey effort between observers were not uniform (Table 18), we record only whether the bird species was observed or not (i.e. presence/absence data) at each survey site. Nevertheless, with the objective of presenting the abundance of the bird species for each habitat class, we calculated the percentage of surveys where the species was recorded.

Except for the Vathe Conservation Area in the humid forest adjacent to Matantas village (and the Loru Protected Area), none of the study sites we surveyed were under legal or customary protection. Traditional hunting using bows or catapults is

in favour among children and men in all tribes visited. Wild birds, especially pigeons and silvereyes, are considered to be an important source of protein and are specifically collected.

## ••• Results

### ••• Species richness

Forty-five species were recorded during our study (Table 19). This is less than Bregulla who listed 50 species in 1992, but more than Medway and Marshall, and Kratter and coauthors who found 41 species in 1975 and 35 species in 2006 respectively. In 1997 Bowen restricted his survey on low elevation habitats and therefore listed only 25 species (Table 20). The list of Bregulla includes birds which have not been observed by any of the four expeditions (Table 20). These are two native species, the Fan-tailed Cuckoo and the White-rumped Swiftlet and two introduced species, the House Sparrow and the Chestnut-breasted Munia. The first two are well known by one of the authors (N.B.) in New Caledonia and the probability is low that we missed them. Quite intensive and careful surveys were made in Luganville and its vicinity where the two introduced granivorous birds were not seen. They are not established if they were ever introduced and are considered absent.

We add one species to the list of Bregulla: the feral Rock Pigeon which occurs in Luganville (a group of 10 birds established around the market) and in the suburbs. It was not recorded in previous surveys. Regarding native species, the status of one of them, the Santo Mountain Starling is problematic. This island endemic has not been observed by any of the survey teams despite a total of 20 days being spent

by ornithologists in different sites of its preferred habitat, the primary mountain forests (Table 18).

### ••• Degree of endemism and species on the IUCN (2006) red list

Among native birds recorded by Bregulla in 1992 at Santo, 13 have a wide distribution in the Pacific region, 21 are represented by a specific subspecies in Vanuatu, ten are Vanuatu endemics at the species level (including the Mountain Starling and the Santa Cruz Ground-Dove exclusive of Santo) and one, the Buff-bellied Monarch, at the genus level (Table 19).

Our observations show that four exotic species are naturalised in Santo. They were introduced either by Melanesian settlers during their colonisation of the south Pacific during the last 3000 years (Red Junglefowl) or by Europeans during the last century (the remaining three species, Table 19). The Common Myna was not recorded in Santo in 1944 by Scott, as quoted by Medway and Marshall, who found the bird widely dispersed in urban, suburban and agricultural areas except in the northern and northeast settled strips in 1971. The Black-headed Munia is believed to have been released in Luganville in 1960. Medway and Marshall saw the bird only in Luganville and Aore, the island in front of Luganville on the other side of the Second channel, during their 1971 survey. The Rock Pigeon is restricted to Luganville area and has not been reported before. None of these three species were recorded by Kratter and coauthors in 2006. Among the native birds, ten are on the IUCN red list (Table 19): Santa Cruz Ground-Dove (Endangered); Vanuatu Megapode, Baker's Imperial Pigeon, Palm Lorikeet, Chestnut-bellied Kingfisher, Royal Parrotfinch and Mountain Starling (Vulnerable); Thicket Warbler, Rusty-winged Starling and Tanna Fruit-Dove (Near Threatened).

### ••• Habitats used by bird communities

The 45 species recorded are distributed depending on elevation and habitats. They can be classified according to their site preferences from urban and cultivated habitats at low elevation to undisturbed forests in the Cumberland range. We recognize five groups: lowland birds, ubiquitous birds, ubiquitous birds excluding urban areas, low/medium elevation birds and birds restricted to high elevations (Tables 20 & 21).

#### • Lowland bird communities

All the sites studied in lowlands (0-300 m) are more or less disturbed and modified by human occupancy and activities. They are distributed from sea level to about 300 m (Luganville and villages of Saraoutou, Tasmate, Penaoru, Matantas, Butmas). Five birds, among which three are introduced, are restricted to this level and were not observed in higher sites: natives are the Pacific Swallow and

the Swamphen. The Pacific Swallow was recorded breeding in Luganville (two nests) and in the cliffs of Matantas area (where it hunted flying insects with Woodswallows and Glossy and Uniform swiftlets). The three exotics are recently introduced birds: the Rock Pigeon seen in Luganville and the vicinity (two different groups), the Common Myna and the Black-headed Munia. It is in urban and agro-pastoral habitats that these two species are the most abundant. They are particularly common in the harbour site, in gardens and fallow lands of the town and in grassy habitats along roads. The Myna is strongly attracted by cattle and has therefore high densities in all coconut plantations/pastures grazed by cattle, especially at Saraoutou. The Myna was also recorded at Matantas, Butmas (two birds), Penaoru village (one bird) and Tasmate (one bird).

Out of Luganville, the Munia was seen along roads and tracks at Saraoutou, Matantas (large flocks over 50), Butmas (two birds), Penaoru (five), and Port Olry (5-6 birds).

Birds of this lowland group cohabit with the most important group of ubiquitous birds at the lower level of their range.

#### • Ubiquitous bird communities

This is the most important group, composed of 16 highly adaptable species showing no altitudinal zonation and able to live from urban habitats to mountain forests. Fifteen out of the 16 are natives. However, the aboriginally introduced Junglefowl has the behaviour and the ecological requirements of a native species, restricted like most of them to forest habitats (the bird contacted in Luganville was in a secondary forest and should be the domestic form). This group contains species which favour open cultivated habitats (Woodswallow, Rainbow Lorikeet, swiftlets), secondary scrubs, lowland forests and clearings (Silvewye and White-eye, Gray Fantail, Emerald Dove, Long-tailed Triller, Cardinal Myzomela, Collared Kingfisher), as well as secondary or undisturbed lowlands and premontane forests (Tanna and Red-bellied Fruit Doves, Streaked Fantail, Golden Whister). Most of them are very common at each altitudinal level and each habitat type, including the Tanna Fruit-Dove, the only endemic species of the group. This dove was seen twice in Luganville, and 80% of the surveys from low elevations to premountain forests recorded it (Table 21). Its frequency decreases at higher altitudes where only 50% of the surveys recorded this bird. Despite being common, it is classified as Near Threatened by the IUCN.

#### • Ubiquitous (excluding urban areas) bird communities

This is also a large group of 14 birds which have the same characteristics than the previous group but avoid urban (Luganville) habitats. They generally show a preference for forest habitats and are

Table 19: Birds observed in Santo by the authors during the Santo 2006 survey or by Medway and Marshall 1975 (**MM**); Bregulla 1992 (**BR**), Kratter *et al.*, 2006 (**KR**). Avian nomenclature follows Howard and Moore, 3d edition, corrigenda 5 (Avibase 2008, Dickinson 2003). Subspecies partly from Bregulla 1992. Bislama names from Anthony Harry, pers. comm. 2006. **Endemism-W**: widespread; **EndGen**, **EndSp**, **EndSSp**: endemic genus, species, subspecies; **Int**: introduced. **IUCN (2006) criteria-NT**: near threatened; **VU**: vulnerable; **EN**: endangered. **H**: high elevations.

Family	Latin name	English name	Bislama name	Endemism	IUCN 2006	MM	BR	KR	Santo 2006
Accipitridae	<i>Circus approximans</i>	Swamp Harrier	Big fala hawk, Mala, Namala, Pijin blong fowl	W	-	X	X	X	X
	<i>Falco peregrinus nesiotus</i>	Peregrine Falcon		W	-	X(H)	X	-	X
Megapodiidae	<i>Megapodius layardi</i>	Vanuatu Megapode	Skraptak, Scrub duck, Namalu	EndSp	VU	X	X	X	X
Phasianidae	<i>Gallus gallus</i>	Red Junglefowl		Int	-	X	X	X	X
Rallidae	<i>Gallirallus philippensis sethsmithi</i>	Buff-banded Rail	Nambilak	W	-	X	X	-	X
	<i>Porphyrio porphyrio samoensis</i>	Purple Swamphen	Nambiru	W	-	X	X	-	X
Columbidae	<i>Ducula bakeri</i>	Baker's Imperial-Pigeon	Nawemba blong hill, Natutus soraifas	EndSp	VU	X(H)	X(H)	X	X
	<i>Ducula p. pacifica</i>	Pacific Imperial-Pigeon	Nawemba, Nawimba	W	-	X	X	X	X
	<i>Macropygia m. mackinlayi</i>	Mackinlay's Cuckoo-Dove	Long fala tel, Brown pijin	EndSSp	-	X	X	X	X
	<i>Chalcophaps indica sandwichensis</i>	Emerald Dove	Sot leg (Short legs)	W	-	X	X	X	X
	<i>Columba livia</i>	Rock Pigeon		Int	-	-	-	-	X
	<i>Columba vitiensis leopoldii</i>	Metallic Pigeon	Natarua	EndSSp	-	X	X	X	X
	<i>Ptilinopus greyii</i>	Red-bellied Fruit-Dove	Smole fala green pijin, Small green pijin	W	-	X	X	X	X
	<i>Ptilinopus tannensis</i>	Tanna Fruit-Dove	Big fala green pijin	EndSp	NT	X	X	X	X
Psittacidae	<i>Chamosyna palmarum</i>	Palm Lorikeet	Denga, Dedenga, Maramarei	EndSp	VU	X(H)	X(H)	X	X
	<i>Trichoglossus haematodus massena</i>	Rainbow Lorikeet	Nasiviru, Nasivrou	EndSSp	-	X	X	X	X
Cuculidae	<i>Chrysococcyx lucidus layardi</i>	Shining Bronze-Cuckoo		W	-	-	X	X	X
	<i>Cacomantis flabelliformis schistaceigularis</i>	Fan-tailed Cuckoo		EndSSp	-	-	X	X	-
Tytonidae	<i>Tyto alba delicatula</i>	Barn Owl	Hoknaet, Hognight	W	-	X	X	-	X
Apodidae	<i>Aerodramus spodiopygius leucopygius</i>	White-rumped Swiftlet		EndSSp	-	-	X	-	-
	<i>Collocalia esculenta uropygialis</i>	Glossy Swiftlet		EndSSp	-	X	X	X	X
	<i>Aerodramus v. vanikorensis</i>	Uniform Swiftlet		W	-	X	X	X	X
Alcedinidae	<i>Todiramphus chloris santoensis</i>	Collared Kingfisher	Nasiko	W	-	X	X	X	X
	<i>Todiramphus farquhari</i>	Chestnut-bellied Kingfisher	Red Nasiko	EndSp	VU	X	X	X	X
Meliphagidae	<i>Glycifohia notabilis notabilis</i>	New Hebrides Honeyeater	Long fala mouth blong hill	EndSp	-	X (H)	X (H)	X	X
	<i>Myzomela cardinalis tenuis</i>	Cardinal Myzomela	Polis	EndSSp	-	X	X	X	X
Acanthizidae	<i>Gerygone flavolateralis correiae</i>	Fan-tailed Gerygone	Small nalaklak	EndSSp	-	X	X	X	X
Artamidae	<i>Artamus leucorhynchus tenuis</i>	White-breasted Woodswallow		EndSSp	-	X (H)	X	X	X
Campephagidae	<i>Coracina caledonica thilenii</i>	Melanesian Cuckoo-shrike		EndSSp	-	X	X	X	X
	<i>Lalage maculosa modesta</i>	Polynesian Triller		EndSSp	-	-	X	X	X
	<i>Lalage leucopyga albiloris</i>	Long-tailed Triller		EndSSp	-	X (H)	X	X	X
Pachycephalidae	<i>Pachycephala pectoralis intacta</i>	Golden Whistler		EndSSp	-	X	X	X	X
Rhipiduridae	<i>Rhipidura albiscapa brenchleyi</i>	Gray Fantail	Nasiksik	EndSSp	-	- (?)	X	X	X
	<i>Rhipidura verreauxi spilodera</i>	Streaked Fantail		EndSSp	-	X	X	X	X
Monarchidae	<i>Clytorhynchus pachycephaloides grisescens</i>	Southern Shrikebill		EndSSp	-	X	X	X	X

	<i>Myiagra caledonica marina</i>	Melanesian Flycatcher		EndSSp	-	X	X	X	X
	<i>Neolalage banksiana</i>	Buff-bellied Monarch	Zaizari	EndGen	-	X	X	X	X
Petroicidae	<i>Petroica multicolor ambrynsensis</i>	Scarlet Robin		EndSSp	-	X(H)	X	X	X
Hirundinidae	<i>Hirundo tahitica</i>	Pacific Swallow		W	-	X	X	-	X
Sylviidae	<i>Megalurulus whitneyi whitneyi</i>	Thicket Warbler	Zizileri	EndSSp	NT	X	X(H)	-	X
Zosteropidae	<i>Zosterops lateralis vatensis</i>	Silver-eye	Nalaklak	EndSSp	-	X(H)	X	X	X
	<i>Zosterops flavifrons brevicauda</i>	Yellow-fronted White-eye	Nalaklak	EndSp	-	X	X	X	X
Sturnidae	<i>Acridotheres tristis</i>	Common Myna	Pijin blong buluk, Sako	Int	-	X	X	-	X
	<i>Aplonis zelandica rufipennis</i>	Rusty-winged Starling	Woohia	EndSp	NT	X(H)	X(H)	-	-
	<i>Aplonis santovestris</i>	Mountain Starling	Mataweli	EndSp	VU	-	X(H)	-	-
Turdidae	<i>Turdus poliocephalus vanikorensis</i>	Island Thrush		W	-	X	X	X	X
Passeridae	<i>Passer domesticus</i>	House Sparrow		Int	-	-	X	-	-
Estrildidae	<i>Erythrura cyaneovirens</i>	Royal Parrotfinch	Batukira	EndSSp	VU	X(H)	X	-	X
	<i>Lonchura castaneothorax</i>	Chestnut-breasted Munia		Int	-	-	X	-	-
	<i>Lonchura malacca (= atricapilla)</i>	Black-headed Munia	Bengali	Int	-	X	X	-	X
<b>TOTAL</b>						<b>41</b>	<b>50</b>	<b>35</b>	<b>45</b>

widespread and common from low elevation to upper levels. They include the Melanesian Cuckoo-Shrike, Buff-bellied Monarch, Fan-tailed Gerygone, Mackinlay's Cuckoo-Dove and the quite common Pacific Imperial Pigeon (a group of 20 was seen eating fruits of the "nakatambol" (*Dracontomelon vitiense*) at Matantas. Some are less frequently observed at all sites. Amongst these are the Thicket Warbler (IUCN Near Threatened) seen once in dense undergrowth of a clear mature forest at 300 m at Butmas and in mature regrowth at 1120 m in Nokovula but also at low elevation in mesophyllous vine forests at Hog Harbour. If not rare, it is a secretive, inconspicuous bird. At higher elevations the Melanesian Flycatcher (one pair was observed nesting at Penaoru), the Metallic Pigeon, the Swamp Harrier, the Chestnut-bellied Kingfisher (IUCN Vulnerable) and the Shining Bronze-Cuckoo are in this rarely observed category. Two species, the Island Thrush (common at Matantas) and the New Hebrides Honeyeater (one seen in degraded forests at sea level at Tasmate) prefer the forests at higher elevations (67% and 83% of the surveys over 900 m recorded them, respectively). In this group, we include the Peregrine Falcon, seen at sea level by us (Saraoutou, Matantas, Tasmate) and Bowen in 1997 (Loru), by us at high altitude at Penaoru (900 m) and by Medway and Marshall in 1975 at 1120 m (Nokovula). It is remarkable that the Harrier appreciates open habitats but also hunts over forests even at high elevations. In this group of 14 species three are endemic at either the genus level (Buff-bellied Monarch) or species level (Chestnut-bellied Kingfisher and New Hebrides Honeyeater). All three are common, at least in one of the habitat types and altitudinal levels, but the Chestnut-bellied Kingfisher is rare at higher elevations.

#### • Low/medium elevation species

Five species are restricted to open (Buff-banded

Rail, Barn Owl) or forested (Southern Shrikebill, Santa-Cruz Ground Dove and Vanuatu Megapode) habitats from sea level to the foothill. The endemic Megapode has been seen in the dry forests along the shore at Saraoutou, as well as in the primary undisturbed forests on the coral slopes in the same area. It has been seen and heard also in Matantas forests and is hunted at Butmas (but its dark red meat is not much appreciated). The eggs of this species are also commonly collected, eaten and sold. The other endemic species, the Santa-Cruz Ground Dove is apparently very rare, and is the only Santo bird classified as Endangered by the IUCN. It was not recorded by Medway and Marshall in 1975 nor by Kratter and coauthors in 2006, but was recorded by Bregulla in 1972 (in the highlands at 1000 m and at lower elevations at 300 m) who considered it scattered in suitable habitats of the mid-mountain forests. This bird was recorded twice (one, then two birds) on the Penarou trail, at 300-400 m near bamboo clumps. This is one of the three rarest terrestrial birds of Santo, and the scarcity of observations did not allow us to identify its ecological requirements and threats.

#### • Species restricted to high elevations

This is a group of seven species (including the Santo Mountain Starling which was not observed by any of the recent ornithological teams), and four endemics at the species level. The endemic Baker's Imperial Pigeon (IUCN Vulnerable) lives in mature forest and has been recorded at 300 m at Butmas, but more regularly at upper elevations up to the mountain summits. It is a shy and elusive bird, possibly because it is a favoured prey species for hunters. The Scarlet Robin seen from 600 m is common at this altitude and may be even more abundant at higher elevations. It lives alone or in small family groups, feeding from 2 m to the upper canopy. The Polynesian Thriller apparently

Table 20: Bird species recorded at sites prospected by the authors during the **Santo 2006** mission or, by Bowen 1997 (**Bow**), Medway and Marshall 1975 (**MM**) and Kratter *et al.*, 2006 (**KR**). Sites are Luganville (**Lug**), Saroutou and vicinity of Luganville (**Sara**), Port Olry (**PO**), Tasmate (**Tas**), Penaoru (**Pen**), Matantas (**Mat**), Butmas (**But**), Loru (**Lor**), Apuna River (**Apu**), Hog Harbor (**Hog**), Tsaraepae (**Tsa**), Wunaroahare (**Wun**) and Nokovula (**Noko**). Site elevation is precised.

	Urban areas	Anthropogenic low elevations						Anthrop. medium elevations	Primary forest medium/high elevations				Primary forest high elevations					
	Santo 2006	Santo 2006					Bow	MM	Santo 2006				KR		Santo 2006	MM		
	Lug 0-30	Sara 0-50	PO 0-20	Tas 0-200	Pen 0-60	Mat 0-60	Lor 0-120	Apu 100	Hog 160	But 300	Pen 100-300	Pen 600	But 600	Tsa 500-700	Wun 600-1200	Pen 900-1200	Pen 1200-1500	Noko 1100
<b>Lowland birds</b>																		
Pacific Swallow	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Rock Pigeon	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Common Myna	X	X	-	X	X	X	-	-	-	X	-	-	-	-	-	-	-	-
Black-headed Munia	X	X	X	-	X	X	-	-	-	X	-	-	-	-	-	-	-	-
Purple Swamphen	X	X	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-	-
<b>Ubiquitous birds</b>																		
White-breasted Woodswallow	X	X	-	X	X	X	X	-	-	-	-	-	-	X	X	-	-	X
Long-tailed Triller	X	X	-	X	X	X	-	-	-	X	-	-	-	X	-	X	-	X
Emerald Dove	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X
Rainbow Lorikeet	X	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	-	-
Glossy Swiftlet	X	X	X	X	X	X	X	X	X	X	X	-	X	X	X	-	-	-
Silver-eye	X	X	-	X	X	X	X	-	-	X	X	X	-	X	X	X	-	X
Uniform Swiftlet	X	X	X	-	X	X	-	X	-	X	-	-	-	X	X	-	X	-
Cardinal Myzomela	X	X	-	-	X	X	-	X	X	X	X	X	X	X	X	X	X	X
Tanna Fruit-Dove	X	X	-	-	X	X	X	X	-	X	X	X	-	X	X	X	X	-
Gray Fantail	X	X	-	X	X	X	X	-	-	X	X	X	X	X	X	X	-	-
Collared Kingfisher	X	X	X	X	X	X	X	-	-	X	-	X	X	X	X	X	-	-
Golden Whistler	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Red-bellied Fruit-Dove	X	X	X	-	X	X	X	X	X	X	X	-	X	X	X	-	-	X
Streaked Fantail	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X
Yellow-fronted White-eye	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	X
Red Junglefowl	X	X	-	X	X	X	-	X	X	X	X	X	-	-	-	X	X	-
<b>Ubiquitous (excluding urban areas) birds</b>																		
Pacific Imperial-Pigeon	-	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-
Melanesian Cuckoo-shrike	-	X	-	X	X	X	X	X	X	X	X	-	X	X	X	X	-	X
Melanesian Flycatcher	-	X	-	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-
Buff-bellied Monarch	-	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Fan-tailed Gerygone	-	X	-	X	X	X	-	X	X	X	-	-	X	X	X	X	-	X
Metallic Pigeon	-	X	-	X	X	X	X	X	-	X	-	-	X	X	X	-	-	-
Swamp Harrier	-	X	X	-	X	X	X	-	X	X	-	-	-	X	X	-	-	X
Mackinlay's Cuckoo-Dove	-	X	-	-	X	X	X	X	X	X	X	X	-	X	X	X	X	X
Chestnut-bellied Kingfisher	-	X	X	-	-	X	X	X	X	X	X	-	-	X	X	-	-	-
Shining Bronze-Cuckoo	-	X	-	-	-	X	-	-	-	X	-	-	-	X	X	-	-	-
Peregrine Falcon	-	X	-	X	-	X	X	X	-	-	-	-	-	-	-	X	-	-
Island Thrush	-	-	-	-	-	X	-	X	X	X	-	-	-	-	X	X	-	X

New Hebrides Honeyeater	-	-	-	X	-	-	-	-	-	-	-	X	-	X	X	X	X	X
Thicket Warbler	-	-	-	-	-	-	-	-	X	X	-	-	-	-	-	-	-	X
<b>Low/medium elevation birds</b>																		
Barn Owl	-	X	-	-	-	X	X	-	-	-	-	-	-	-	-	-	-	-
Santa Cruz Ground-Dove	-	-	-	-	-	-	-	-	-	-	X	-	-	-	-	-	-	-
Buff-banded Rail	-	X	-	-	-	X	X	-	-	X	-	-	-	-	-	-	-	-
Southern Shrikebill	-	X	-	-	-	X	X	X	X	X	X	X	X	X	-	-	-	-
Vanuatu Megapode	-	X	-	-	-	X	X	X	-	X	-	-	-	X	-	-	-	-
<b>Birds restricted to high elevations</b>																		
Baker's Imperial-Pigeon	-	-	-	-	-	-	-	-	-	X	-	-	X	X	X	X	-	X
Scarlet Robin	-	-	-	-	-	-	-	-	-	-	-	X	-	-	X	X	X	X
Palm Lorikeet	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	X	X	X
Polynesian Triller	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	X	-	-
Royal Parrotfinch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X
Rusty-winged Starling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X
<b>Birds listed by Bregulla (1992) but not recorded by any of the other surveys</b>																		
Fan-tailed Cuckoo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
White-rumped Swiftlet	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chestnut-breasted Munia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
House Sparrow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mountain Starling	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>	<b>21</b>	<b>35</b>	<b>9</b>	<b>21</b>	<b>26</b>	<b>35</b>	<b>25</b>	<b>23</b>	<b>20</b>	<b>34</b>	<b>20</b>	<b>18</b>	<b>16</b>	<b>31</b>	<b>29</b>	<b>23</b>	<b>12</b>	<b>22</b>

inhabits the same range as the Robin but appears less common (seen by us only once at about 800 m in a primary forest on Cumberland slopes). The Palm Lorikeet, an endemic small parrot (IUCN Vulnerable) was observed at 800 m (two birds), later at 900 m (one individual flying silently, low in the vegetation) and at 1 100 m (a group of birds in a flowering tree) along the Penarou trail. This nomadic bird was also recorded at 1 100-1 500 m on the Tabwemasana slopes by Medway and Marshall in 1975 who indicate previous observations at Hog Harbour at sea level. A small flock of the Royal Parrotfinch (IUCN Vulnerable) was observed at 1 100 m at Penarou (and also at 1 120 m at Nokovula by Medway and Marshall in 1975). It is certainly very rare, restricted to upper elevation zones only. We did not see either of Santo's two starlings. None of the recent expeditions, which all together spent 20 days in suitable habitats, recorded the Santo endemic Mountain Starling (IUCN Vulnerable), which is obviously very rare and may be restricted to the most remote summits of Santo. The same may also be true for the endemic Rusty-winged Starling (IUCN Near Threatened) recorded by Medway and Marshall in 1975 only, at Nokovula (1 120 m).

### • • • Conclusion

The terrestrial bird fauna of Santo comprises about 47 species, including two uncertain Starlings that

none of the authors saw during this expedition. The avifauna is otherwise well known, with 100 days of field work during four expeditions in the last 30 years, particularly so for low/medium elevation bird communities. The usual rainy weather conditions at higher altitudes make bird survey more difficult and less productive, even though 12 days were spent there. Moreover, some seabirds, especially petrels, nesting in the mountainous interior have never been studied and none was heard during the nights we spent in the mountains. The fauna is diverse with an important guild (eight species) of frugivorous/granivorous pigeons and families well established elsewhere in the Pacific region (Campephagidae, Monarchidae, Meliphagidae). Most of the birds, particularly passerines, are common and do not show altitudinal zonation. Sixty-four percent of the 47 species exhibit a large range of tolerance to altitude, being established from sea level to mountain summits. This is probably an indication of the good state of forested habitats, preferred by most of these birds all around Santo, which have been only partially and locally altered by clearings for pastures and coconut plantations. The situation may change for lowland forests which are potentially threatened by invasive aggressive vines (*Mikania micrantha*, *Meremia peltata*). For most of the birds the conservation status appears satisfactory despite significant hunting pressure and impact by invasive

Table 21: Proportions (%) of prospectings having recorded the different bird species. Proportions are calculated for the five habitat classes. We called prospection the inventory of the bird species of any site belonging to the habitat class under study, by every single observer whatever the time he spent at this site. Several prospectings can have been carried out at a same site (i.e. when several observers inventoried the bird species of this site). Name of sites are given in Tables 18 & 20. **Endemism-W**: widespread; **EndGen**, **EndSp**, **EndSSp**: endemic genus, species, subspecies; **Int**: introduced. **IUCN (2006) criteria-NT**: near threatened; **VU**: vulnerable; **EN**: endangered.

	<b>Endemism</b>	<b>IUCN 2006</b>	<b>Urban areas</b>	<b>Low elevation habitats (0-60 m)</b>	<b>Medium elevation habitats (100-300 m)</b>	<b>Medium/high elevation habitats (500-700 m)</b>	<b>High elevation habitats (900-1500 m)</b>
Number of survey sites			1	7	4	3	4
Number of surveys			3	7	6	4	6
<b>Lowland birds</b>							
Pacific Swallow	W	-	67	14	0	0	0
Rock Pigeon	Int	-	33	29	0	0	0
Common Myna	Int	-	100	71	33	0	0
Black-headed Munia	Int	-	100	71	17	0	0
Purple Swamphen	W	-	33	29	17	0	0
<b>Ubiquitous birds</b>							
White-breasted Woodswallow	EndSSp	-	33	86	0	25	33
Long-tailed Triller	EndSSp	-	33	57	17	0	50
Emerald Dove	W	-	100	100	100	50	67
Rainbow Lorikeet	EndSSp	-	100	100	100	50	33
Glossy Swiftlet	EndSSp	-	100	100	83	50	17
Silver-eye	EndSSp	-	100	86	50	75	67
Uniform Swiftlet	W	-	100	71	50	25	33
Cardinal Myzomela	EndSSp	-	100	43	83	75	83
Tanna Fruit-Dove	EndSp	NT	67	71	83	75	50
Gray Fantail	EndSSp	-	67	71	50	100	33
Collared Kingfisher	W	-	33	100	33	75	33
Golden Whistler	EndSSp	-	33	86	100	100	100
Red-bellied Fruit-Dove	W	-	33	71	83	50	33
Streaked Fantail	EndSSp	-	33	71	83	75	33
Yellow-fronted White-eye	EndSp	-	33	71	67	75	67
Red Junglefowl	Int	-	33	57	83	25	33
<b>Ubiquitous (excluding urban areas) birds</b>							
Pacific Imperial-Pigeon	W	-	0	86	83	100	33
Melanesian Cuckoo-shrike	EndSSp	-	0	86	83	50	50
Melanesian Flycatcher	EndSSp	-	0	86	67	75	17
Buff-bellied Monarch	EndGend	-	0	71	83	75	83
Fan-tailed Gerygone	EndSSp	-	0	71	50	50	50
Metallic Pigeon	EndSSp	-	0	71	33	50	17
Swamp Harrier	W	-	0	71	33	25	33
Mackinlay's Cuckoo-Dove	EndSSp	-	0	57	67	50	67
Chestnut-bellied Kingfisher	EndSp	VU	0	57	67	25	17
Shining Bronze-Cuckoo	W	-	0	29	17	25	17
Peregrine Falcon	W	-	0	57	0	0	33
Island Thrush	W	-	0	14	50	0	67
New Hebrides Honeyeater	EndSp	-	0	14	0	50	83
Thicket Warbler	EndSSp	NT	0	14	17	0	17



Low/medium elevation birds							
Barn Owl	W		0	43	0	0	0
Santa Cruz Ground-Dove	EndSp	EN	0	0	17	0	0
Buff-banded Rail	W	-	0	57	33	0	0
Southern Shrikebill	EndSSp	-	0	43	67	75	0
Vanuatu Megapode	EndSp	VU	0	43	33	25	0
Birds restricted to high elevations							
Baker's Imperial-Pigeon	EndSp	VU	0	0	17	50	50
Scarlet Robin	EndSSp	-	0	0	0	25	67
Palm Lorikeet	EndSp	VU	0	0	0	25	67
Polynesian Triller	EndSSp	-	0	0	0	25	33
Royal Parrotfinch	EndSSp	VU	0	0	0	0	33
Rusty-winged Starling	EndSp	-	0	0	0	0	17

plants, however, the situation seems critical for some endemic species which have not, or have only rarely, been observed by visiting ornithologists. This is the case for a group of birds restricted to mid-mountain forests (Santa Cruz Ground Dove) or to highlands (Baker's Imperial Pigeon, Palm Lorikeet, Royal Parrotfinch, Santo Mountain and Rusty-winged Starlings). Specific attention has to be paid to the two Santo island-endemics at least, the Santo Mountain Starling and the Santa Cruz Ground-Dove, the IUCN status of the former needs probably to be revised to a higher category of threat. Conversely, species like the Chestnut-bellied Kingfisher should be downgraded and the Tanna Fruit-Dove, very common everywhere, could even be removed from the Red List Threat

Categories. As in New Caledonia, endemic and threatened species are mainly restricted to mountain forests (Table 21).

The introduced bird community is very limited with three birds coming in contact with the native fauna (the feral Rock Pigeon is in Luganville town and suburbs). The Common Myna and the Black-headed Munia are strictly restricted to lowland disturbed/modified/open habitats in association with humans, and any potential impact on native avifauna is questionable. The Junglefowl is established in forests. It may compete with the Megapode which shares the same habitat, but this endemic remains apparently in good health after centuries of cohabitation.

# Santo

## The Natural History of

The islands of the Pacific are renowned for the high levels of endemism of, and threats to, their unique faunas and floras. Espiritu Santo, affectionately known simply as Santo, is an island of superlatives: the largest and highest in Vanuatu, Santo is an extraordinary geographical and cultural microcosm, combining reefs, caves, mountains, satellite islands, and a history of human habitation going back 3 000 years. In the spirit of famous voyages of discovery of the past, the Santo 2006 expedition brought together over 150 scientists, volunteers and students originating from 25 countries. With contributions by more than 100 authors, *The Natural History of Santo* is a lavishly illustrated homage to the biodiversity of this "planet-island". Bridging the gap between scientific knowledge and conservation and education, *The Natural History of Santo* was written with local stakeholders as well as armchair naturalists from all over the world in mind.

Les îles du Pacifique sont célèbres pour le très haut niveau d'endémisme et la grande vulnérabilité de leurs faunes et de leurs flores. L'île d'Espiritu Santo, ou Santo, cumule les superlatifs : la plus grande et la plus haute du Vanuatu, Santo est un extraordinaire microcosme géographique et culturel, avec récifs, grottes, montagnes, îles et îlots satellites, et une occupation humaine qui remonte à 3 000 ans. Renouant avec l'esprit des "Grandes Expéditions Naturalistes", l'expédition Santo 2006 avait mobilisé sur le terrain plus de 150 scientifiques, bénévoles et étudiants de 25 pays. Petit tour de force éditorial avec plus de 100 auteurs, ce *Natural History of Santo* est un éloge de la biodiversité de cette "île-planète". À la fois beau livre richement illustré et bilan des connaissances scientifiques, *The Natural History of Santo* se veut un outil de connaissance pour sa conservation durable. Il s'adresse autant aux acteurs locaux du développement et de l'éducation qu'aux naturalistes du monde entier.



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