

# Short Communications

## Field Observations of the Birds of Santa Isabel, Solomon Islands

Horace P. Webb

2048 White Oak Circle, Kennesaw, Georgia 30144, U.S.A.

EMU Vol. 92, 52-57, 1992. Received 7-6-1990, accepted 10-1-1991

The Solomon Islands have long been considered an area of great ornithological interest, yet nothing more than species lists without field notes have been published for some of the major islands. This is true for Santa Isabel (also known as Bughotu, Santa Ysabel, or Ysabel) despite its being the fourth largest island and the fifth most species-rich in the Solomons (74 resident species previously reported). My species list of Santa Isabel birds incorporates collections made by the Rev. Robert Welchman in the 1890s (Tristram 1892, 1894, 1895), by Albert Meek in 1900 (Rothschild & Hartert 1902) and by the Whitney South Seas Expedition in 1927, whose records were never reported in detail but were incorporated by Mayr (1945) in his book.

### Geography

Santa Isabel is approximately 4095 km<sup>2</sup> in area, 200 km in length and averaging 24 km in width (Fig. 1). The island is situated between latitude 7°12' and 8°35' S and longitude 155° and 158° E. As with all islands of the so-called Bukida chain, (extending from Buka to Florida or Guadalcanal), Santa Isabel has a north-west to south-east orientation. A ridge of mountains runs parallel to the island's axis, and reaches its highest elevation at Mount Kubonitu (1250 m) about 32 km north-west of the south-eastern end of the island.

Santa Isabel is mostly covered with tropical rainforests typical of other islands in the Solomons, but its

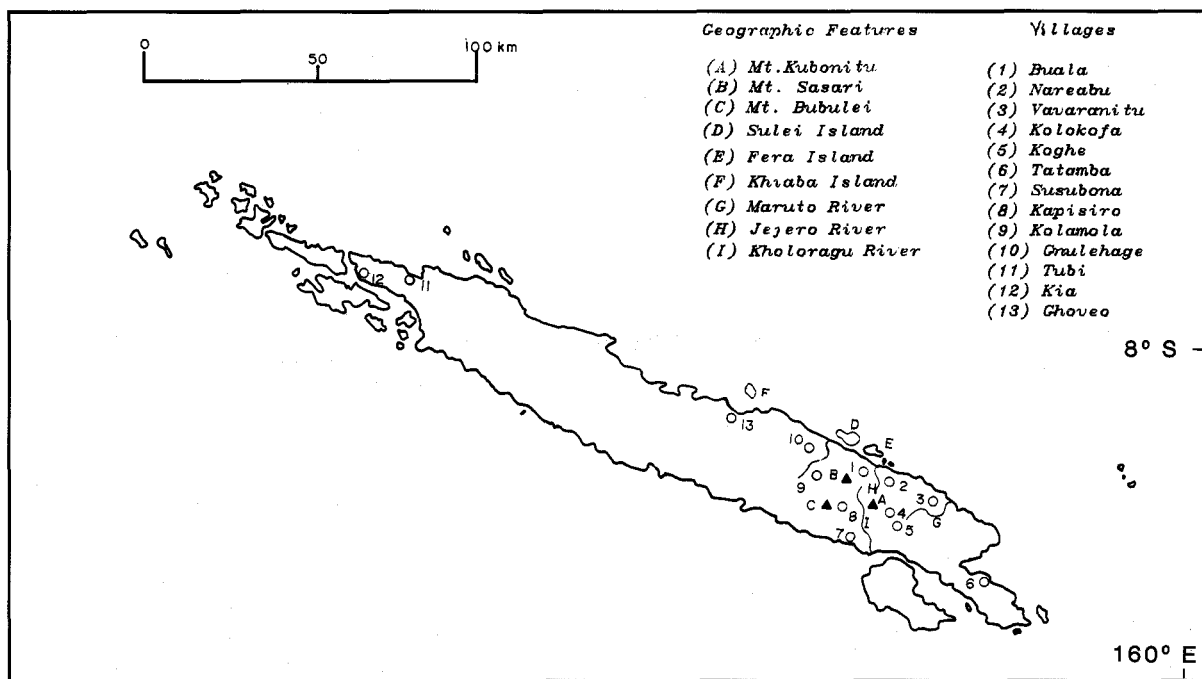


Figure 1 Geographic features and villages of Santa Isabel.

**Table 1** List of all bird species observed on Santa Isabel from 27 September 1986 to 21 September 1988. Names of birds in the local language, Cheke Holo, appear in parenthesis. Letters and numbers summarise habitat preference and abundance. Habitat: a = coastal and marine, b = sea and swamp shore, c = lowland forest, d = mountain forest, e = interior of forest, f = lowland and mountain forest, g = lowland garden and secondary growth, h = upland secondary growth, i = ubiquitous, v = villages. Abundance: 1 = common, 2 = locally common, 3 = uncommon, 4 = local and uncommon, 5 = rare, 6 = rare and local.

Brown Booby <i>Sula leucogaster</i> a, 2	Eclectus Parrot <i>Eclectus roratus</i> (makhara) f, 1
Masked Booby <i>Sula dactylatra</i> a, 5	Singing Parrot <i>Geoffroyus heteroclitus</i> c, g, 2
Least Frigatebird <i>Fregata ariel</i> (glegaha) a, 2	Brush Cuckoo <i>Cacomantis variolosus</i> (nahuhu) i, 1
Striated Heron <i>Butorides striatus</i> (khokoro) a, 1	Golden Bronze Cuckoo <i>Chrysococcyx lucidus</i> 1 migrant
Eastern Reef Heron <i>Egretta sacra</i> a, 1	April–September
Rufous Night Heron <i>Nycticorax caledonicus</i> (khopi) a, 1	Solomon Islands Hawk-Owl <i>Ninox jacquinoti</i> (nakrudu) c, d, 1
Pacific Black Duck <i>Anas superciliosa</i> (baba'a) a, c, 2	Fearful Owl <i>Nesoasio solomonensis</i> (khikinsu) f, 6
Crested Baza <i>Aviceda subcristata</i> (fakakrahe) c, f, 1	White-throated Nightjar <i>Eurostopodus mystacalis</i> a, 6
Brahminy Kite <i>Haliastur indus</i> (saroko) a, c, g, 1	Uniform Swiftlet <i>Collocalia vanikorensis</i> (gagable) g, 1, to 900 m
Grey Goshawk <i>Accipiter novaehollandiae</i> (kikhipa) a, g, 1	White-rumped Swiftlet <i>Collocalia spodiopygia</i> (gagable) d, 4
Pied Goshawk <i>Accipiter albogularis</i> (suisui) a, f, g, 1	Glossy Swiftlet <i>Collocalia esculenta</i> (gagable) e, 4
Imitator Sparrow Hawk <i>Accipiter imitator</i> (khutureo) e, f, 6	Whiskered Tree Swift <i>Hemiprocne mystacea</i> (khekerora) g, 1
Sanford's Sea Eagle <i>Haliaetus sanfordi</i> (gaghata) i, 3	Common Kingfisher <i>Alcedo atthis</i> c, 1
Osprey <i>Pandion halietus</i> (gaiganisasa) a, 2	Little Kingfisher <i>Ceyx pusillus</i> (phichouchou) a, c, 3
Common Scrub Hen <i>Megapodius freycinet</i> (kho'io) a, c, 2	Dwarf Kingfisher, <i>Ceyx lepidus</i> f, 3
Bush Hen <i>Amaurornis olivaceus</i> (kongeo) c, g, 1	White-collared Kingfisher <i>Halcyon chloris</i> (khiakia) c, g, 1
Woodford's Rail <i>Nesoclopeus woodfordi</i> (dodo'ili or Bughotu koko'ili) c, 4	White-headed Kingfisher <i>Halcyon saurophaga</i> (khiokhio) a, 2
Purple Swampphen <i>Porphyrio porphyrio</i> (naphiro) i, 1	Sacred Kingfisher <i>Halcyon sancta</i> a, g, 1 migrant
American Golden Plover <i>Pluvialis fulva</i> a, 2	April–September
Turnstone <i>Arenaria interpres</i> a, 2	Ultramarine Kingfisher <i>Halcyon leucopygia</i> (sikroekroe) c, g, 1
Far Eastern Curlew <i>Numenius madagascariensis</i> a, 2	Dollar-bird <i>Eurystomus orientalis</i> (buburukoilo) g, 1
Whimbrel <i>Numenius phaeopus</i> a, 2	Blyth's Hornbill <i>Aceros plicatus</i> (nakhongo) f, 2
Common Sandpiper <i>Actitis hypoleucos</i> (churi) a, 1	Pacific Swallow <i>Hirundo tahitica</i> (sikapu) v, 1
Bar-tailed Godwit <i>Limosa lapponica</i> 2	Black-bellied Cuckoo-shrike <i>Coracina holopolia</i> c, 1
Curlew Sandpiper <i>Calidris ferruginea</i> a, 4	Cicada bird <i>Coracina tenuirostris</i> (fisa) f, 1
Sanderling <i>Calidris alba</i> a, 5	Yellow-eyed Cuckoo-shrike <i>Coracina lineata</i> f, 1
Beach Thick-knee <i>Burhinus neglectus</i> (bibili) a, 1	White-bellied Cuckoo-shrike <i>Coracina papuensis</i> f, g, h, v, 1
Common Tern <i>Sterna hirundo</i> (thotogamhoko) a, 4	Melanesian Cuckoo-shrike <i>Coracina caledonica</i> d, 6 Mt. Kubonitu area
Black-naped Tern <i>Sterna sumatrana</i> (jopla) a, 1	Rufous Fantail <i>Rhipidura rufifrons</i> c, 1
Little Tern <i>Sterna albifrons</i> (naega) a, 3	Cockerell's Fantail <i>Rhipidura cockerelli</i> f, 3
Common Noddy <i>Anous stolidus</i> a, 1	Willie Wagtail <i>Rhipidura leucophrys</i> (phipituale) g, v, 1
Superb Fruit Dove <i>Ptilinopus superbus</i> (bahlu vona) c, g, 4	Island Grey-headed Monarch <i>Monarcha cinerascens</i> a, 2 Fera, Sulei, Khiaba Islands, (Fig. 1)
Red-bibbed Fruit Dove <i>Ptilinopus viridis</i> (thuknu) c, g, 2	Chestnut-bellied Monarch <i>Monarcha castaneiventris</i> f, 1
Red-knobbed Pigeon <i>Ducula rubricera</i> (bahlu nohlo) c, g, 1	Pied Monarch <i>Monarcha barbatus</i> f, 2
Island Imperial Pigeon <i>Ducula pistrinaria</i> (bahlu tongna) a, c, g, 1	Steel-blue Flycatcher <i>Myiagra ferrocyanea</i> f, 3
Crested Long-tailed Pigeon <i>Reinwardtoena crassirostris</i> (fela) c, 1	Golden Whistler <i>Pachycephala pectoralis</i> (kuacho) d, 4
Brown-backed Emerald Dove <i>Chalcophaps stephani</i> (bahlu pari) c, 1	Singing Starling <i>Aplonis cantoroides</i> (khukudu) a, 1
Nicobar Pigeon <i>Caloenas nicobarica</i> (giano) a, c, 1	Large Glossy Starling <i>Aplonis grandis</i> (khukudu) c, 1
Cardinal Lory <i>Eos cardinalis</i> (chikri) a, g, 1	Shining Starling <i>Aplonis metallica</i> (sele) c, f, 1
Rainbow Lorikeet <i>Trichoglossus haematodus</i> (sivoro) i, 1	Yellow-faced Mynah <i>Mino dumontii</i> (khikilo'a) c, g, d, 1
Meek's Lorikeet <i>Charmosyna meeki</i> d, 6	White-billed Crow <i>Corvus woodfordi</i> (na'ao) f, 2
Duchess Lorikeet <i>Charmosyna margarethae</i> (sigre) a, c, g, 4	Yellow-bellied Sunbird <i>Nectarina jugularis</i> (sirikiti) a, v, 1
Finch's Pygmy Parrot <i>Microspitta finschii</i> (luti tamna) d, 1 500–1000 m	Small Bougainville Honeyeater <i>Myzomela lafargei</i> (sesese) i, 1
Ducorps Cockatoo <i>Cacatua ducorpsi</i> (vega) i, 1	Yellow-throated White-eye <i>Zosterops metcalfei</i> (cheu) i, 1
	Solomon Islands Flowerpecker <i>Dicaeum aeneum</i> (sirikiti) i, 1

south-eastern third has large areas of coconut plantings, and the northwestern two-thirds extensive coastal mangrove swamp.

The forests of Isabel are separated in three altitudinal zones. The lowland forests range from sea level to approximately 500 m, and are composed of large trees reaching a height of 40-50 m with a dense understory up to 15 m in height. At approximately 500 m the lowland forests give way to one of two types of vegetation: dense reeds and a few stunted trees in the area of Mount Sasari, or forests of smaller trees (approximately 15-30 m in height) with a less dense understory of shrubbery and tree ferns (approximately 4 m in height) in the area of Mt. Kubonitu. The highest zone of vegetation begins at around 1000 m and consists of cloud forest comprising smaller tree ferns and stunted, moss covered, epiphyte-hung trees that are approximately 10-15 m in height.

The population of Santa Isabel is about 15 000; with 80% concentrated in the south-eastern two-thirds of the island. Of the remaining 20%, one-third is concentrated at Kia village at the extreme north-western end of the island. There are seven languages spoken on Santa Isabel; the major three are Bughotu, Cheke Holo and Zabana. Local names will be given in Cheke Holo unless another language is specified.

## Observations

I was stationed on Santa Isabel in Jejevo Village from 27 September 1986 to 21 September, 1988 as a U.S. Peace Corps Volunteer. Based on records of rainfall that I kept in Jejevo village, 2350 mm fell during my first year, and 3850 mm from 28 September 1987 to 21 September 1988. Rainfall was slightly greater from December to April when the winds were from the northwest, in contrast to the period May to November when trade winds blew from the south-east. During this time I was able to visit many parts of the island, record all but four resident species previously reported and observe the habits and distributions of some little known Solomon Island species (Table 1). The sources for English names were Anon. (1969) and Schodde (1975).

**Pied Goshawk** *Accipiter albogularis*; **Little Pied Sparrow Hawk** *Accipiter imitator*. In the Cheke Holo language these species are named onomatopoeically after their calls as *suisui* and *khutureo* respectively. The call of *A. imitator* is a loud, high pitched raspy 'reo' call that is repeated at roughly 5 second intervals as it soars.

The call of *A. albogularis* is a high, clear rapidly repeated 'sui-sui-sui' as it soars. Both birds live in the inland forest and are found in the lower valleys up to an altitude of about 1000 m. *A. albogularis* has a rufous dorsal collar and white underparts. I often saw it soaring above valleys between Bara and Kologaru Villages (Fig. 1). *A. imitator*, a smaller species than *A. albogularis*, is one of the least known accipiters in the world. It has been collected on only a few occasions on Bougainville, Choisel and Isabel. Live sightings have not been previously reported. My two sightings were of black individuals calling and soaring in July 1988 above valleys between Bara and Kologaru Villages. The difference in calls between these two accipiters has not been previously described and is diagnostic in the field.

**Sanford's Eagle** *Haliaeetus sanfordi*. This Solomon's endemic is found throughout Isabel from the coast to the mountains. It is called *gaghata* in Cheke Holo, and is the symbol of the chiefly clan. I observed an individual on Fera Island (Fig. 1) near the provincial airport feeding on the carcass of a shark.

**Woodford's Rail** *Nesoclopeus woodfordi*. This large rail which is endemic to the Solomon Islands has been collected on Guadalcanal, Isabel and Bougainville but the only specimen known from Guadalcanal is the type and there are no records from Bougainville since 1936 (Hadden 1981). The sole Isabel record consists of two specimens collected by the Whitney South Seas Expedition in 1927 not far from my home. Diamond (1987) speculates that the species is extinct on Guadalcanal and Bougainville.

On Isabel, *N. woodfordi* is an uncommon bird of true forest as mentioned by Mayr (1945), but seems to prefer riparian habitats. My three observations were in river valleys, and the purported nest shown to me was also near a river. I observed *N. woodfordi* twice in forest in the Maruto River Valley above Vavaraitu Village on 12 June 1987 and 21 August 1987, and near the Kholoragu River above Kapisiro and Koghe Villages on 20 July 1988 (Fig. 1). In each case I had only a brief view of the bird. On two of the occasions it darted across a trail or a clearing in the undergrowth; on the other occasion it walked to within 5 m of me and then quickly darted out of sight.

*N. woodfordi* is timid. It skulks along stiffly jerking its head back and forth as it walks. When startled, it runs quickly out of sight with its head lowered and neck outstretched. Its call is an unmusical series of metallic shrieks unvarying in pitch, and generally delivered in

threes. Reliable local informants reported that *Dodo'ili* (Cheke Holo), or *Koko'ili* (Zabana), as the bird is known, occasionally digs in gardens, eats the young shoots of taro plants and also eats worms, insects, frogs, lizards, small snakes and snails. It occasionally forms a part of the local diet of the people of Isabel, when one is caught by dogs or in traps set for the Pacific Black Duck *Anas superciliosa*.

I examined a specimen that had been badly mauled by dogs north of Gnulehage Village (Fig. 1) where the Whitney Expedition probably collected its two specimens (Beck). The bird was about 30 cm long, had a large strong beak about 4 cm long and short strong legs and feet. Its overall appearance was very dark. The upper-parts appeared black with a rufescent wash, while the breast was dull black-grey. The bill was a light horn color at the tip, and graded into dark grey at the base. This fresh specimen differed from published descriptions in its having dark green-yellow legs and orange-red rather than red eyes.

On 22 July 1988 I was shown a nest purportedly belonging to *N. woodfordi*. It was situated under a small bush in an area of lowland forest near a stream about 2 km north of Kolamola Village (Fig. 1), and was constructed of rootlets, leaves and other unidentifiable vegetable matter, and measured approximately 25 cm across. In the shallow depression which was approximately 15 cm across, were six eggs 30-40 mm in length. The eggs were oval and off white in colour and marked with dark brown spots more heavily distributed at the large end. In the American Museum of Natural History I have since examined a set of four eggs collected by the Whitney Expedition on Isabel in 1927 and found them virtually identical to the eggs that I examined on Isabel except for their more pyriform shape.

**Bush Hen** *Amaurornis olivaceus* are common and known in the Cheke Holo language as *kongeo*. During May and June nights from 1900 to 2200 h, I regularly heard wild duets consisting of alternating shrieks overlapping in a harmonic beat phenomena that results in a yodelling sound ('woodle-woodle-woodle...'). These duets lasted up to 20 seconds followed by an interval of 15-30 seconds before the next duet. I heard *A. olivaceus* at practically every village that I visited below 200 m. These vocalisations were not restricted to night time but were sometimes heard during overcast days. The clucking calls described by other observers were heard only when there was a single bird calling. This frequently heard but seldom seen bird seemed to prefer marshy

areas, overgrown gardens or the edges of tall forest nearby.

**Sanderling** *Calidris alba*. This uncommon migrant was observed at Fera and Khiaba Islands during late January 1987 and December 1987. There are only two previous records for *C. alba* in the Solomons, from Bougainville by Hadden (1981) and from Three Sisters by French (1957).

**Crested Long-tailed Pigeon** *Reinwardtoena crassirostris*. From sea level to approximately 400 m I heard this endemic Solomon's pigeon at many localities throughout Isabel: near Vavaranitu, Tatamba, Gnulehage, Ghoveo, Tubi, Susubona and Jejevo Villages (Fig. 1). This bird was frequently heard but observed only once. *R. crassirostris* is known as *fela* in Cheke Holo, and is associated with sorcery. Its call was a two-note, hollow mournful cry. Each note was about 1.5 seconds in duration, beginning at the same pitch and then descending in pitch.

**Meek's Lorikeet** *Charmosyna meeki*. While there are no records of this endemic Solomon parrot from Isabel, the unpublished journals of the Whitney South Seas Expedition in the American Museum of Natural History mention observing '... the small green paroquets ...' while on a collecting trek up Mount Sasari (1231 m) between 23 and 27 August 1927. These journals also mention that at an altitude of approximately 975 m a specimen was shot but not retrieved. '... small green paroquets ...' was the vernacular applied to *C. meeki* by the Whitney collectors in their journals (Diamond pers. comm.). I made two trips up Mt. Sasari but did not observe *C. meeki* there. However, I observed it on four occasions (13 and 14 July, and 11 and 13 August 1988) near the summit of Mt. Kubonitu at altitudes between 900 and 1000 m. The birds were in groups of 2-5 feeding in the tops of flowering trees, and were identified by their rather uniform green colour, yellow underside of the tail, bright red bill and high pitched 'tweek-tweek call'. I do not know any local names for *C. meeki*.

**Brush Cuckoo** *Cacomantis variolosus*. This bird was common on Isabel but was more often seen than heard. It had two calls: one a series of 3-5 loud whistling notes that drop in pitch and the other a series of seven notes, the first four of clear whistles followed by three trilled notes all rising in pitch. The Cheke Holo name for this bird is *nahuhu*.

**Fearful Owl** *Nesasio solomonensis* is a little known owl of the Solomons, recorded only from Bougainville, Choisel and Isabel. On Isabel it was confined to lowland and mountain forests where it is known as

*kikhirisu* in Cheke Holo. *N. solomonensis* called most frequently June–September which suggests that its breeding season may occur during these months. The call was a long drawn out hoo with a rise in pitch at the end. The call may occur up to four times per minute. This owl reportedly feeds on phalangers *Phalanger orientalis* and was found only in forest supporting a large population of this prey.

**Solomon Islands Hawk-owl** *Ninox jacquiniti* was found everywhere on Isabel. Its name is *nakrudu* in Cheke Holo. It is a cavity nester, and eats crickets and grasshoppers. The call that I recorded for *N. jacquiniti* was a long, low tremulous note similar to that of the American Screech Owl but lower in pitch and with a slower quaver. Duetting between individuals was noted.

**Glossy Swiftlet** *Collocalia esculenta*, **Uniform Swiftlet** *Collocalia vanikorensis*, **White-rumped Swiftlet** *Collocalia spodiopygia*. The three species of swiftlet occurring on Santa Isabel are known collectively as *gagable* in Cheke Holo. *C. esculenta* is the smallest and commonest. *C. vanikorensis* is larger and was seen virtually everywhere in Santa Isabel flying above open areas such as villages or garden plots. The flight and vocalisations of these two swiftlets differ: *C. esculenta* flew rapidly close to the ground, with acrobatic darting, rolling and changes in direction; *C. vanikorensis* was more sluggish in its flight. The vocalisations of *C. esculenta* were tight grating cheeps, those of *C. vanikorensis* soft twittering sounds. Both occurred together up to about 400 m altitude but *C. vanikorensis* ranged beyond to about 900 m where it overlapped the range of *C. spodiopygia*. Despite this, I never saw them together, as I commonly did *C. esculenta* and *C. vanikorensis*. *C. spodiopygia* is slightly smaller than *C. vanikorensis* and was a much swifter and more acrobatic flyer. On Isabel it was confined to altitudes above approximately 700 m. I observed it on three occasions: twice near Mount Kubonitu and once near Mount Bubulei above Koghe Village (Fig. 1). The Mount Kubonitu flocks contained about 20–30 birds; fewer were in the Mount Bubulei flock.

**Island Grey-headed Monarch** *Monarcha cinerascens*. This small flycatcher seemed to be restricted to small islands off the Isabel mainland. I observed it on Fera, Sulei, and Khiaba Islands and never on the mainland.

#### Montane species

Only five species were exclusively confined to the mountain areas of Isabel above 900 m. These are *Char-*

*mosyna meeki*, *Microspitta finschii*, *Collocalia spodiopygia*, *Coracina caledonica* and *Pachycephala pectoralis*.

#### Unobserved species

During my period on Isabel I observed all but four species that had been previously reported from the island. These were the Common Koel, Marbled Frogmouth, White-throated Pigeon and the Island Leafwarbler. There is an unconfirmed report (Diamond pers. comm.) of the Common Koel *Eudynamis scolopacea*. Even where it is common it is seldom seen but its loud distinctive call would identify its presence. The Marbled Frogmouth *Podargus ocellatus* is a nocturnal species which is difficult to observe during daylight because of crypsis. It is probably the bird called *nauroga* in Cheke Holo. I never observed the White-throated Pigeon *Columba vitiensis* that is frequently reported in the journals of the Whitney South Seas Expedition but which is not mentioned by Mayr (1945). The Island Leafwarbler *Phylloscopus trivirgatus* although small and inconspicuous, is usually moderately abundant where it occurs. My lack of records is inexplicable.

#### Acknowledgements

It is a pleasure to note my great debt to Jared Diamond, who advised me in my field work and assisted me in the preparation of this paper. I must also acknowledge the invaluable assistance of Jeffrey White in smoothing my learning of the Cheke Holo language. I also thank Mary LeCroy of the American Museum of Natural History for her assistance in preparing this manuscript, and referees W. Filewood and R. Schodde. Lastly I must thank Sir Dudley Tuti, Nathaniel Hebala, Hugo Pulomana, Andrew Gedi, Steven Kidia, Edith Ehamana, Hugo Bugoru, Clement Rojumana and the countless men, women and children of Isabel who shared their knowledge of their birds with me, and endured my endless questioning.

#### References

- Anon. 1969. An Index of Australian Bird Names. Division of Wildlife Research Technical Paper No. 20. CSIRO.
- Beck, R.H. Journals of the Whitney South Seas Expedition (1927) (unpublished) Vol. D, pp. 256–262 (housed in the Museum of Natural History, New York).
- Diamond, J.M. 1987. Extant Unless Proven Extinct? Or Extinct Unless Proven Extant? *Conservation Biology* 1, 77–79.
- Drowne, F.P. Journals of the Whitney South Seas Expedition

- (1927) (unpublished) Vol. P, pp. 175-217 (housed in the Museum of Natural History, New York).
- Hadden, D. 1981. Birds of the North Solomons. Wau Ecology Institute Handbook No. 8.
- French, W. 1957. Birds of the Solomon Islands. *Ibis* 99, 126-130.
- Mayr, E. 1945. Birds of the Southwest Pacific. Macmillan, New York.
- Rothschild, W. & Hartert, E. 1902. List of a collection of birds made on Ysabel Island in the Solomon Group by Mr. A.S. Meek. *Novitates Zoologicae* 9, 581-594.
- Schodde, R. 1975. Interim List of Australian Songbirds Passerines. RAOU, Melbourne.
- Tristram, H.B. 1892. On two small collections of birds from Bugotu and Florida, two of the smallest Solomon Islands. *Ibis* (6) 4, 293-297.
- Tristram, H.B. 1894. On some birds from Bugotu, Solomon Islands and Santa Cruz. *Ibis* (6) 6, 28-31.
- Tristram, H.B. 1895. Further notes on birds from Bugotu, Solomon Islands, with descriptions of a new species. *Ibis* (7) 1, 373-376.

## Breeding biology of the Yellow-bellied Sunbird *Nectarinia jugularis* in Northern Queensland

William J. Maher

Department of Biology, University of Saskatchewan, Saskatoon, Canada S7N 0W0

EMU Vol. 92, 57-60, 1992. Received 6-6-1990, accepted 25-2-1991

The Yellow-bellied Sunbird *Nectarinia jugularis* of northern Queensland nests commonly near human habitation and while many details of its biology are known (see, for example, Frith 1979) the species has not been intensively studied.

The Yellow-bellied Sunbird is the only member of the Nectariniidae in Australia. It is a nectarivore as are the smaller endemic Australian honeyeaters (Meliphagidae) and this study compares the development and biology of members of these two families. From 20 August to 25 November 1984, I recorded details of its breeding biology, and that of the Brown-backed Honeyeater *Ramsayornis modestus*, in tropical open forest near Townsville, Queensland, latitude 19°15'S. Here I report the nest situation, nest distribution, breeding biology and nestling survival of the Yellow-bellied Sunbird.

### Study area and methods

The study was done from 20 August to 25 November 1984 in the Townsville Town Common Environmental Park, mostly along the Forest Track (Fig. 1). The Forest Track is in open *Eucalyptus-Melaleuca* woodland on the verge of a shallow seasonal swamp. Principal woodland trees were paperbarks, primarily *Melaleuca dealbata*, in and along the edge of the swamp, and a mixture

of *Eucalyptus* and *Acacia* on higher ground. An understory of shrubs was dominated by an introduced species, Chinese Apple *Zizyphus mauritania*.

Coastal Queensland has contrasting rainy and dry seasons. In Townsville, 70% (789 mm) of annual rain falls in the warmest months from December through March. Monthly mean temperatures range from 19.3°C in July to 27.6°C in January. The weather during the study was typical of this pattern. More details on the study area, methods and climate are in Maher (1986, 1988).

### Results

#### The population

I found 14 active nests in different stages of the nesting cycle, five in September, three in October and six in November (Fig. 1). The distribution of these nests in time and space suggests a population of about eight breeding pairs.

Breeding density was estimated for 13.3 ha of the study area where Yellow-bellied Sunbirds nested, including a buffer zone one-half the mean inter-nest distance or 65 m around the nests. Four active nests in September, two in October and five in December gave