Barau's Petrel, Mascarene Petrel and other tubenoses off Réunion, Indian Ocean, in December 2014

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Réunion, an island in the Indian Ocean c 700 km east of Madagascar and administratively an overseas department of France, has long been on our itinerary of seabird locations to visit, particularly because of its two endemic breeding tubenoses: the endangered Barau's Petrel *Pterodroma baraui* and the critically endangered Mascarene Petrel *Pseudobulweria aterrima*. This paper focuses on our observations of these and other tubenose species in December 2014. During our stay, we booked six short-range pelagic trips to see both species, with a special effort to photograph the rarest tubenose species of all, Mascarene. Joining us on most days were local French ornithologists Fabien Mada and Martin Riethmuller; the latter is author of the plan of action to save Mascarene (Riethmuller et al 2012).

Logistics

The prospect of a pelagic trip off Réunion is very exciting indeed. It is well positioned for visiting/passage seabirds that breed on nearby Round Island, and for others much farther away to the north, east and south. Our trip followed a similar successful trip in December 2012 (Shirihai et al 2014). On our pelagic trips, we set out at c 13:30 and steamed offshore to our chumming spot. We deployed chum blocks, supplied by local company Oceane Production, and a small amount of self-imported Menhaden oil. We placed a little oil and one or two chum blocks per hour into the sea at our chumming locations. We maintained contact with the chum blocks by drifting to the end of the oily slick, then motoring back to the chum block at the top of the slick, drifting back down the slick, and so on. At sunset (c 19:00) we steamed back to port, arriving at c 21:00 or later. Two of our pelagic trips were with Pêche Sud Evasion from St Pierre in the south, and four were with Réunion Fishing Club from St Gilles in the north-west. A seventh daytime trip was organised on 13 December but this was not a serious attempt to see Mascarene Petrel. A summary of locations and conditions for each short-range pelagic trip is given in table 1. Weather conditions were good for petrels on four evenings with force 3 or stronger wind speed.

TABLE 1 Details of short-range pelagic trips off Réunion, Indian Ocean, in December 2014 / Details van pelagische tochten op korte afstand van Réunion, Indische Oceaan, in december 2014

Date	Harbour	Position from harbour	Wind conditions
7 Dec	St Pierre	27-29 km SSW	3-4B
8 Dec	St Pierre	30-32 km SSW	4-5B
9 Dec	St Gilles	16 km W	3B
10 Dec	St Gilles	16 km W	1-2B
11 Dec	St Gilles	32 km WSW	3B
12 Dec	St Gilles	29 km W	1-2B
13 Dec	St Gilles	16 km W	1B

Results

Counts of the tubenoses seen on each trip are given in table 2, with details and discussion about the sightings in the following species accounts.

Barau's Petrel (plate 466-467)

Barau's Petrel was described new to science only in 1963 (Jouanin 1963), based on a bird caught alive on the beach of St Gilles, Réunion, in April of that year. It was taken to Armand Barau who was a prominent figure on the island with a deep interest in (the conservation of) birds of Réunion.

At present, Barau's Petrel is only known to breed in burrows in volcanic soils beneath elfin forest in the mountainous centre of Réunion (Brooke 1978, Probst & Thébaud 1998). Breeding has also been reported from nearby Rodrigues (Brooke 1978), although this could not be confirmed (Probst 1996a). Threats to breeding birds include predation by cats and rats (Probst 1996b, Probst et al 2000, Faulquier et al 2009), while many fledglings are disorientated by the bright city lights of Réunion and crash land nearby (Le Corre et al 2002). Between March and September, birds are thought to roam the Indian Ocean possibly west to Madagascar, north to Sri Lanka, east to Australia, and to sea areas 1850 km south of Réunion (van

466 Barau's Petrel / Baraus Stormvogel *Pterodroma baraui*, off Réunion, Indian Ocean, 7 December 2014 *(Mike Danzenbaker)*

467 Barau's Petrel / Baraus Stormvogel *Pterodroma baraui*, off Réunion, Indian Ocean, 7 December 2014 *(Kirk Zufelt)*

den Berg et al 1991, Stahl & Bartle 1991, Robertson 1994, Pinet et al 2011b), but this is uncertain due to problems with at-sea recognition (Shirihai et al 2014).

Each trip, we saw 30 to over 50 Barau's Petrels. They were sighted from shortly after leaving harbour to our farthest chumming point at 32 km offshore. Some Barau's were attracted to the chum and flew up the oily slick sniffing the surface, with several dropping onto the sea by the chum blocks to collect morsels. At times, four or five birds foraged over the chum simultaneously. We occasionally saw Barau's join in the feeding frenzies of shearwaters and noddies. Barau's is one of the most easily seen *Pterodroma* species from land. In the evening, birds fly along the surf close to shore off St Pierre. Prior to dusk, birds gain height offshore before heading inland, as witnessed from St Gilles.

Mascarene Petrel (plate 468-472)

The life history of Mascarene Petrel has recently been detailed by Shirihai et al (2014, 2015). In this paper, we therefore concentrate on our observations.

We saw and photographed two birds: one 30-32 km south-southwest of St Pierre at 16:09 on 8 December (plate 468-469), and one 16 km west

TABLE 2 Counts of tubenoses seen during short-range pelagic trips off Réunion, Indian Ocean, in December 2014 / Tellingen van stormvogels tijdens pelagische tochten op korte afstand van Réunion, Indische Oceaan, in december 2014

	7 Dec	**8 Dec**	**9 Dec**	**10 Dec**	**11 Dec**	**12 Dec**	**13 Dec**
Barau's Petrel *Pterodroma baraui*	50+	40+	40+	45+	40+	50+	30+
Mascarene Petrel *Pseudobulweria aterrima*	0	1	1	0	0	0	0
Wedge-tailed Shearwater *Puffinus pacificus*	40+	25+	30+	70+	25+	30+	25+
Tropical Shearwater *Puffinus bailloni*	100+	20+	40+	100+	20+	20+	20+
Bulwer's Petrel *Bulweria bulwerii*	2	1	1	0	6	4	0
Wilson's Storm Petrel *Oceanites oceanicus*	0	0	2+	3	4	2	1

of St Gilles at 15:15 on 9 December (plate 470-472). This is only the second occasion that the species has been photographed at sea. The St Gilles record is the first Mascarene Petrel observed and photographed offshore of north-west Réunion. Both birds showed a degree of wear in the plumage with moult contrast and thus were not juveniles. The first Mascarene was relatively lightweight compared with the second bird and probably a female. The second was an exceptionally heavyset bird, with a notably robust bill, and presumably a well-developed adult male. To date, this is the most heavily-built bird to be photographed.

Both birds were drawn in by the chum but neither stayed for long, and neither flew off toward the island. Timing of the sightings suggests birds foraging in offshore waters rather than returning to their burrows. This indicates that birds will forage during the afternoon at least as close as 16 km from shore. Unlike our two birds, the majority of Mascarene Petrels seen by Shirihai et al (2015) were after 17:00, most after 18:00, and some of them headed toward the island presumably returning to their burrows.

We saw two birds in six trips, Shirihai et al (2015) reported 33 observations in three trips. Stage of the breeding season, timing and location of chumming sessions, type of chum, and weather conditions during the two operations were much the same. However, the moon cycle was a variable that differed significantly. The influence of the moon cycle varies depending on species, stage of breeding, and between breeders and non-breeders. In addition, a powerful typhoon hit Réunion a few days after the 2012 operations and the large influx on the 2012 trip may have resulted in part from an urgency of the petrels to return to their burrows before the storm (Hadoram Shirihai pers comm). The operations by Shirihai et al (2014, 2015) were early in a waxing moon while our operations were around the full moon. We know from our own experiences that breeding petrels tend to remain at sea during the full moon (also see Robb et al 2008). Not taking the moon cycle into account during operational planning was something of an oversight.

Two hypotheses have been put forward to explain why seabirds tend to remain at sea during bright moonlight (eg, Rubolini et al 2014). The *predation avoidance hypothesis* is the idea that seabirds like petrels do not return to the colony under moonlight as predators can take advantage from increased visibility. The *foraging efficiency hypothesis* is the idea that moonlight may reduce prey availability, as prey occurs at greater depths on moonlit nights, so petrels need longer foraging trips to collect the required prey. There is also the counter proposition that petrels may stay at sea longer because their prey becomes more detectable (Pinet et al 2011a). Petrels are more likely to return to colony during the full moon if a thick cloud cover creates darkness. We experienced largely clear skies. Particularly pertinent to this article is a unique case study that documents the regulation of the life history of Barau's Petrel by photoperiod and moon phases (Pinet et al 2011a).

We found the field identification of Mascarene Petrel challenging because we lacked previous field experience of the species. Prior to the sighting of the first bird we had several 'false alarms' involving Wedge-tailed Shearwaters *Puffinus pacificus* flying away from the boat at mid-distance in

468-469 Mascarene Petrel / Réunionstormvogel *Pseudobulweria aterrima*, 30-32 km south-southwest of St Pierre, off Réunion, Indian Ocean, 8 December 2014 *(Mike Danzenbaker)*

470-472 Mascarene Petrel / Réunionstormvogel *Pseudobulweria aterrima*, 16 km west of St Gilles, off Réunion, Indian Ocean, 9 December 2014 *(Mike Danzenbaker)*

less than optimal light. Furthermore, we initially thought that the relatively lightly-built first Mascarene was a Jouanin's Petrel *Bulweria fallax*. However, identification of the heftier second bird as Mascarene was straightforward, in part because of its heavy build, and in part because we were better prepared following the field experience and critical analysis of the photographs of the first bird (drawing on Shirihai et al 2014). In short, it took us time 'to get our eye in', a problem accentuated by the paucity of Mascarene throughout our operations. We appreciate the concern expressed by Shirihai et al (2014) about past errors in the identification of Mascarene, and the importance of substantiating future sightings with photographs.

Other tubenose species (plate 473-478)
Few other tubenose species were encountered. Tubenose species most commonly observed were Wedge-tailed Shearwater and Tropical Shearwater *P bailloni* that both breed on Réunion. Less common were Bulwer's Petrel *B bulwerii* and Wilson's Storm Petrel *Oceanites oceanicus*. The latter species was only observed off St Gilles. Other common seabirds seen included White-tailed Tropicbird

473 Wedge-tailed Shearwater / Wigstaartpijlstormvogel *Puffinus pacificus*, off Réunion, Indian Ocean, 11 December 2014 *(Mike Danzenbaker)* **474** Wedge-tailed Shearwater / Wigstaartpijlstormvogel *Puffinus pacificus*, off Réunion, Indian Ocean, 7 December 2014 *(Kirk Zufelt)*

475 Tropical Shearwater / Baillons Kleine Pijlstormvogel *Puffinus bailloni*, off Réunion, Indian Ocean, 10 December 2014 *(Mike Danzenbaker)* **476** Tropical Shearwater / Baillons Kleine Pijlstormvogel *Puffinus bailloni*, off Réunion, Indian Ocean, 10 December 2014 *(Kirk Zufelt)* **477** Bulwer's Petrel / Bulwers Stormvogel *Bulweria bulwerii*, off Réunion, Indian Ocean, 11 December 2014 *(Kirk Zufelt)* **478** Bulwer's Petrel / Bulwers Stormvogel *Bulweria bulwerii*, off Réunion, Indian Ocean, 12 December 2014 *(Mike Danzenbaker)*

Phaethon lepturus, Brown Noddy *Anous stolidus*, Lesser Noddy *A tenuirostris* and Sooty Tern *Onychoprion fuscatus*.

Each trip we encountered several feeding frenzies of Wedge-tailed Shearwaters, Tropical Shearwaters and noddies. Feeding frenzies occurred where large fish were preying on small fish and pushing them to the surface, especially in areas baited by the fishing industry. For Wedge-tailed, highest counts were over 40 and over 70 at substantial-sized feeding frenzies, while for Tropical, the highest count was over 100. Both Bulwer's Petrel and Wedge-tailed were readily attracted to chum, often flying up the slick, and occasionally dropping onto the chum and feeding on floating morsels. Some birds flew toward the island, especially in the evening. Tropical gathered in flocks before dusk off St Gilles.

Concluding remarks

Timing is important. Mid-December to late December is a good time to undertake short-range pelagic trips in search of Barau's Petrel and Mascarene Petrel. This is just after or toward the end of the pre egg-laying exodus. We suspect that it is best to avoid periods around the full moon. December is within the relatively settled period November-February, although it is also the typhoon season when the relative calm can turn into a massive storm and potentially blow out a week-long visit. That said, typhoons in December are uncommon and more likely in the New Year.

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Samenvatting
Baraus Stormvogel, Réunionstormvogel en andere stormvogels rond Réunion, Indische Oceaan, in december 2014 Dit artikel bespreekt waarnemingen van stormvogels tijdens een serie van zes korte pelagische trips vanuit Réunion, Indische Oceaan, in december 2014. Speciale aandacht werd besteed aan de bedreigde Baraus Stormvogel *Pterodroma baraui* (waarnemingen van 30 tot meer dan 50 exemplaren op elk van de zes trips) en de ernstig bedreigde Réunionstormvogel *Pseudobulweria aterrima* (twee verschillende exemplaren gefotografeerd op 8 en 9 december).

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