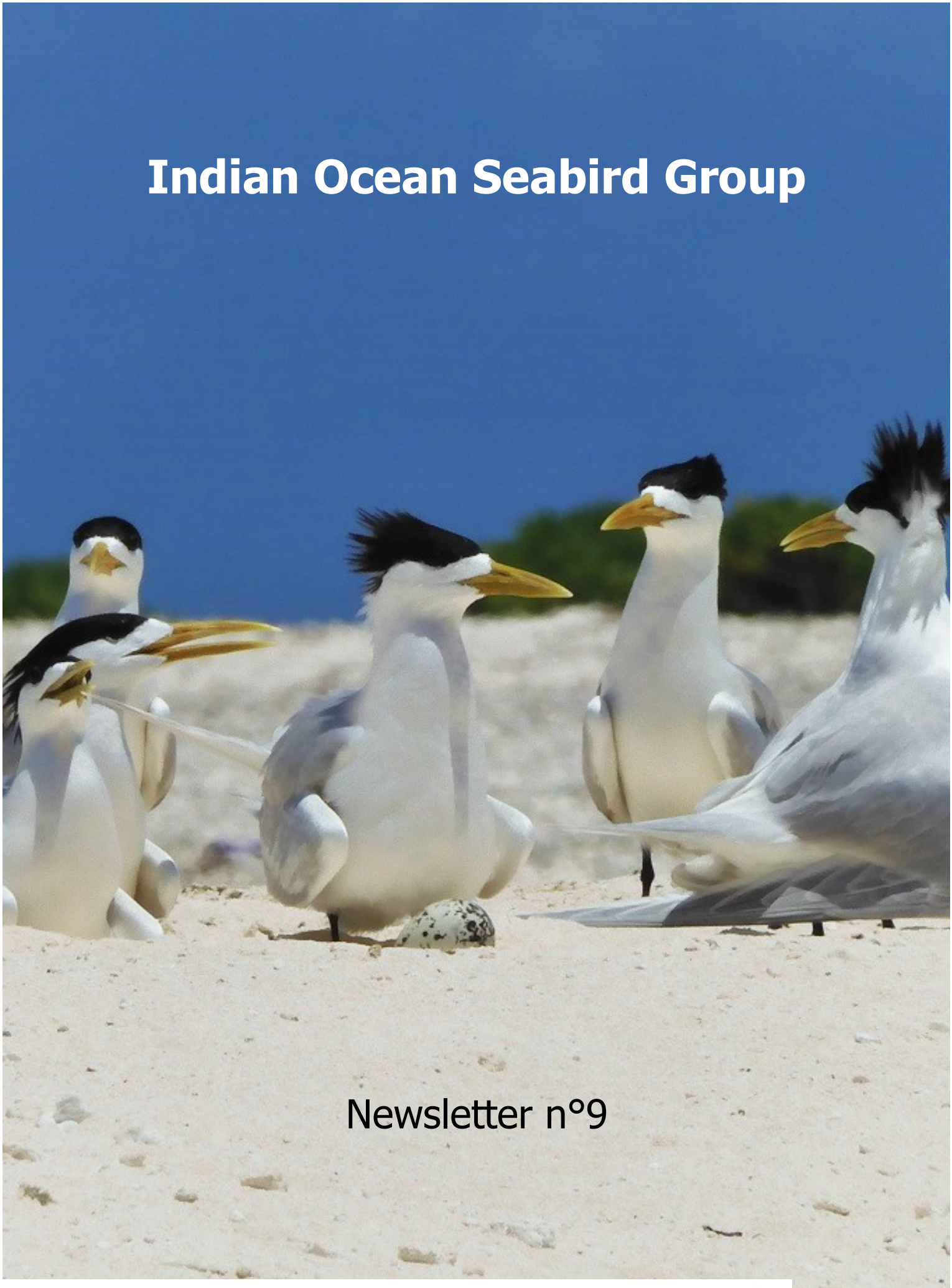
Indian Ocean Seabird Group



Newsletter n°9

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SMAC Seabirds multidisciplinary applied research for Conservation

IOSG NEWSLETTER n° 9

June 2021

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EDITO

Dear IOSG members,
we wish you a happy reading!

Matthieu and Sabine

ANNOUNCEMENTS

- **World Seabird Conference n°3 (WSC3): October 4-8, 2021**

The Conference will be held virtually this year.

https://worldseabirdconference.com

- **Bio-logging Symposium n°7 (BLS7): October 18-22, 2021**

The symposium will be virtual too.

https://www.bls7hawaii.com

- **Summary of the World Seabird Twitter Conference n°7 (#WSTC7):**

The WSTC7 was conducted on 4-6 May 2021. The abstract book is available here:

https://docs.google.com/document/d/1TS9DDGhImFwa0EZ4xtYvXI0uARJy8iJVY91RRSHGxKY/edit

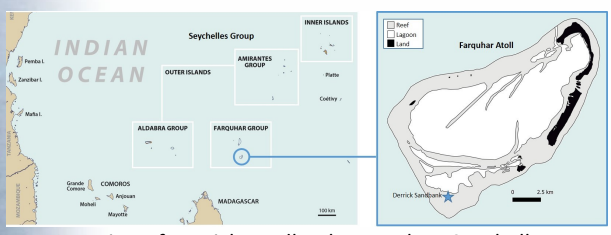
- **Job offer:**

The ENTROPIE lab of the University of Réunion Island is offering a 4-year postdoc position (2 years renewable once) on population and conservation genetics of tropical seabirds of the Indian Ocean. The deadline for applying is 30 August 2021. The starting date is 1st October 2021. People interested are invited to send an email to Laurence Humeau (Laurence.humeau@univ-reunion.fr) and Matthieu Le Corre (lecorre@univ-reunion.fr) to know more about the project.

1°) Seabird colonisation on a sandbank of Farquhar Atoll

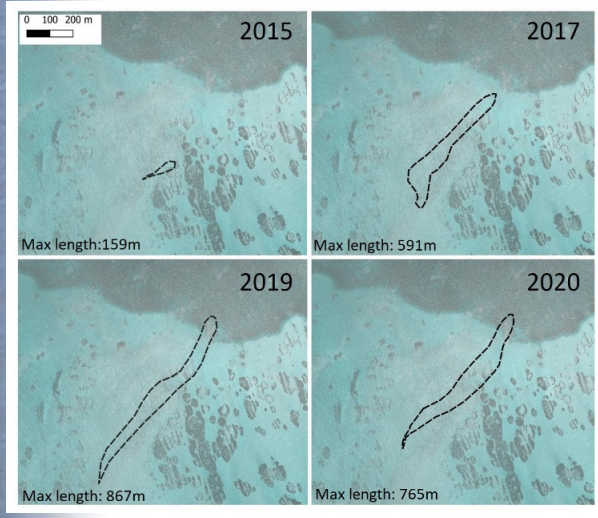
Matthew Morgan, Annabelle Cupidon & Pierre-André Adam

In the face of climate change and sea-level rise, the terns of Farquhar Atoll (Seychelles) have a new nesting ground, a sandbank.



Location of Derrick sandbank, Farquhar, Seychelles.

Farquhar's complex lagoon is highly dynamic, and the emergence of sandbanks has not been studied in detail. In 2016, a large bank formed following a cyclone and providing temporary nesting grounds for Greater crested terns (*Thalasseus bergii*), but subsided below the mean high-water mark by 2018. Meanwhile, another sandbank has been growing and is now proving to be very stable. In 2019, the Island Conservation Society (ICS) recorded the first breeding attempts of Greater crested terns and Black-naped terns (*Sterna sumatrana*) at this location, known as Derrick. Since the discovery, ICS has been monitoring the progress of the birds, along with the changing shape and structure of the sand.



The development of Derrick sandbank, tracks recorded with handheld GPS. Tracks from 2015-17 were collected at low-tide during exposure. Tracks from 2019-20 were collected at high-tide. The sandbank is thought to have become permanently exposed around 2018.

The Greater crested tern nesting population has increased from 10-20 pairs to over 40 (2019-2020), and Black-naped tern numbers remain encouraging at around 10 pairs. Furthermore, it is also proving to be an active roost for annual migrants with over 500 Saunders terns (*Sterna saundersi*) recorded.

Greater crested terns shading their eggs from the mid-day sun (© A. Cupidon).

Amazingly, coastal vegetation has already colonised, namely *Tournefortia argentea* and *Cocos nucifera*. Nutrients from seabird guano will help solidify loose sand and provide nutrients for vegetation, this combination should in turn reduce tidal erosion. Furthermore, the lack of predators (namely rats and cats) bodes well for attracting more breeding seabirds, thus further increasing the amount of guano deposits. Although the signs are encouraging, at this early stage it is hard to say whether this could be the start of a new island… or another temporary emergence.

Pioneer plant, *Tournefortia argentea* after one year of growth. These plants were found as seedlings in December 2019, now they are over a metre in height (© A. Cupidon).

2°) Potential benefits to breeding seabirds of converting abandoned coconut plantations to native habitats after invasive predator eradication

Peter Carr

Abandoned coconut plantations on many Pacific and Indian Ocean islands, legacy of the coconut industry, are species poor biomes. When an island also has invasive rats, it becomes a seabird desert.

A team from the Institute of Zoology, Zoological Society of London along with colleagues from the Royal Botanic Gardens, Kew and Exeter and Heriot-Watt Universities have been researching the possible outcomes for breeding seabirds of eradicating rats from oceanic islands, with and without conversion of the associated abandoned coconut plantations.

Working for over a decade in the Chagos Archipelago, where some 94% of the terrestrial landmass is rat-infested and the vegetation on these islands is dominated by abandoned coconut plantations, we have counted every breeding seabird on all 55 islands and mapped their habitat. By comparing the number of seabirds breeding in a specific habitat on rat-free islands, we were able to predict the number of seabirds that could potentially colonise an island if invasive rats were eradicated and abandoned coconut plantations were converted to native habitats.

Native savannah habitat on Ile Parasol, Peros Banhos atoll. A habitat favoured by ground-nesting seabirds on rat-free islands in the Chagos Archipelago (© N. Esteban).

We hypothetically ecologically restored Ile du Coin in Peros Banhos atoll, a rat-infested island where 92 % of its vegetation is former coconut plantation. It is the fourth largest island and is representative of all rat-infested islands in the archipelago. At present there are 51 pairs of breeding seabirds made up of three generalist species, Brown and Lesser Noddy and Common White Tern. We predict that following rat eradication, without any habitat management, the number of breeding pairs could rise to 4,306 pairs of 14 species. If though, 1 km^2 of abandoned plantation was converted to equal measures of native savannah and forest, the number of breeding species could potentially increase to 319,762 of 16 species – more than the entire archipelago at present.

Native forest habitat on Ile Petite Bois Mangue, Peros Banhos atoll. A habitat favoured by arboreal nesting seabirds in the Chagos Archipelago (© C. Clubbe).

This research has practical applications not just in the Indian Ocean, but throughout the Tropics. We have shown that on degraded islands where invasive rats and abandoned coconut plantations exist together, eradicating the predator as a single intervention is unlikely to result in fully functional seabird-driven ecosystems. Rats must be

eradicated and the abandoned plantations converted to native habitat.

In the Chagos Archipelago, restoring seabird islands is no longer a 'green dream', it is a matter of funding and political goodwill. Our research shows the requirement for an ecosystem-wide approach to fulfilling these green dreams, and demonstrates the potential colossal gains to the family of birds that are suffering the greatest decline in number – seabirds.

This research was published as:
Peter Carr, Alice Trevail, Sara Bárrios, Colin Clubbe, Robin Freeman, Heather J. Koldewey, Stephen C. Votier, Tim Wilkinson & Malcolm A.C. Nicoll. (2021). Potential benefits to breeding seabirds of converting abandoned coconut plantations to native habitats after invasive predator eradication. Restoration Ecology DOI: 10.1111/rec.13386.
This research was conducted as part of the Bertarelli Programme of Marine Science.

3°) Flat-flies and Seabirds

Gilles Le Guillou & Jean-David Chapelin-Viscardi

The PUPIPO project focuses on pupiparous flies, hematophagous Diptera, ectoparasites of birds (*Ornithomyinae*) and mammals. Samples from France have been studied for several years by one of us (GLG), thanks to a wide network of collectors. This project aims at improving our knowledge of these little known hematophagous insects. The project is gradually being extended to neighbouring countries and overseas regions.

An example of a flat fly : *Ornithomya avicularia* (© S. Barbier).

Common Noddy *Anous stolidus* with a flat-fly on the head (© R. Lorrillière).

In mainland France, seabirds are very rarely carriers of these Ornithomyinae, which does not seem to be the case in tropical zones. Despite this, in 2017, in Brittany, Morgane Caze from «Volée de Piaf» association collected a northern flat-fly *Ornithomya chloropus* on a Long-tailed Jaeger *Stercorarius longicaudus*. Long time ago (1852) a lost adult male magnificent Frigatebird *Fregata magnificens*, was captured at Saumur in Maine-et-Loire. This is the only mention of this species in mainland France. This individual was parasitized by an *Olfersia spinifera*. In 2020, Samantha Renault from « Société d'Etude Ornithologique de la Réunion » collected three specimens of *Olfersia aenescens* on a young White-tailed Tropicbird *Phaeton lepturus*. This species of Ornithomyinés was already known from Saint-Paul Island, but unknown from Réunion Island.

The lost Fregata magnificens of Saumur !, 1852, Château-musée de Saumur (©T. Printemps).

The PUPIPO project currently includes more than 300 participants. Some 7,200 flat-flies from 26 species have been collected on 179 bird species,

with 360 different host/parasite associations, many of these have never been reported before.

Through your activities, we think it appropriate to ask you to participate in the PUPIPO project, in order to improve knowledge about these parasites and their interactions with seabirds in the Indian Ocean.

This project has received support from «Centre d'hébergement et d'étude sur la nature et l'environnement» (CHENE) in Allouville-Bellefosse and from the «Laboratoire d'éco-entomologie» in Orléans.

Participation is free of charge. A collection kit is sent upon request. Information on the PUPIPO project (participation, newsletters) is available from the first author (contact on the last page).

4°) Seabirds of the islets of Mer d'Emeraude, North East madagascar

Anasvaler Mbelomanana, Amélie Landy Soambola & Etienne Bemanaja

Location of islets of « Mer d'Emeraude ».

The islets of "Mer d'Emeraude", north east of Madagascar, were known to host breeding populations of White-tailed tropicbirds (*Phaethon lepturus*) and Caspian Terns (*Hydroprogne caspia*) (Milon 1946 and 1950 and Le Corre & Bemanaja 2009), but previous reports suggested that both species were heavily poached, which may lead to local extinction. No recent data were available on the current status of seabirds at this place. We conducted a survey on this site in July 2020 (austral winter) and in February 2021 (austral summer) in order to estimate the current status of breeding seabirds and to assess trends and threats.

We recorded the persistence of the White-tailed tropicbird and the Caspian Tern, mainly on Nosy Antaly Be (12°7'55"S, 49°21'55"E), Nosy Diego (12°11'6"S, 49°23'31"E) and Kalanosin'Andranotsimaka (12°11'16.91"S, 49°21'46.27"E).

The white-tailed tropicbirds breed on Nosy Antaly Be all year round: 6 active nests were found in July 2020 and around 20 adults were observed in aerial display. Five active nests were found in February 2021 and 13 adults were observed in aerial display. The white-tailed tropicbird population seems to increase on this island, considering anterior information by Le Corre & Bemanaja in 2009 (1 pair and 5 birds in flight in July 2008). This species was also recorded on Nosy Diego but in very low numbers, suggesting an almost extinct colony: only 2 pairs and 2 individuals in flight were observed in July 2020 and 4 individuals in flight without nests in February 2021. Compared to the 15 nests found by Milon in 1946 on this islet, our observation suggests that the colony is currently close to extinction.

Fledgling white-tailed tropicbird, at Nosy Antaly Be, July 2020 (© A. Mbelomanana).

Adult white-tailed tropicbird in incubation, on Nosy Antaly Be, February 2021 (© A. Mbelomanana).

The Caspian tern has been observed breeding on Nosy Diego in July 2020 (1 nest occupied by 2 chicks and 4 adults observed in flight). No nests and birds were seen in February 2021. However, the species is present all year round at Kalanosin'Andranotsimaka (1 adult in July 2020 and 2 in February 2021) and on Nosy Antaly Be (6 adults observed in flight in July 2020 and 4 in February 2021). Local guides told us that it breeds in Kalanosi'Andranotsimaka, and that people poach the chicks. Milon noticed only one nest in Nosy Diego (Milon 1950).

Caspian tern chick, Nosy Diego, July 2020 (© A. Mbelomanana).

The main threats recorded are poaching, egg collection and rats predation. Coastal villagers collect eggs and adults for food as a protein source. These results suggest that replacing egg harvest and poaching by ecotourism focusing on seabirds would be beneficial for the birds and for the community. This implies training, public awareness and management measures to organize the ecotourism activity and to restore the islands (rat eradication or control).

Acknowledgements: Field work was funded by the LMI-Mikaroka (IHSM, CNRO, IRD, UMR ENTROPIE). We thank SMILO (Small Islands Organisations) and the NGO MADA (Monde Au Développement Adapté) for their support and funding as part of the project setting up a Marine Protected Area on the "Mer d'Emeraude".

5°) Revegetation of Bridled Tern nesting sites on Penguin Island, Western Australia

Aurélie Labbé, Kate Brown & Grazyna Paczkowska

Penguin Island, a 12.5ha island just off the coast of Western Australia near Perth, is an important breeding site for several species of marine birds, but particularly for Little Penguins (*Eudyptula minor*) and Bridled Terns (*Onychoprion anaethetus*). The island's vegetation suffered as a result of settlers building shacks to live in, and the introduction of invasive species, both plant species and animal species such as the silver gull. Following the acquisition of the island by the now Department of Biodiversity, Conservation and Attractions, the shacks which contained asbestos were removed, and a more permanent penguin exhibition center and research headquarters were built.

The vegetation habitat somewhat recovered, but the invasive plant species and the silver gull population which boomed thanks to the availability of freshwater on the mainland and the open-air rubbish tip located nearby, continue to pose a threat to the native vegetation which is the preferred habitat of other seabird species to breed.
Hence, a weed-control and revegetation effort were established between myself and DBCA on the northern end of the island, in an attempt to save and restore the remaining native vegetation in 2013.

Through trial and error, Kate Brown, Grazyna Paczkowska and myself managed to re-introduce a native plant that is disappearing from Australian coastal islands: *Malva preissiana*. We also determined that the use of cages to exclude Silver Gulls had a dramatic effect on the survival of native seedlings including *Rhagodia baccata* and *Enchylaena tomentosa*. This appears to be

because breeding Silver Gulls use young seedlings for nesting material, and sometimes they simply rip out seedlings for the fun of it after watching fieldworkers going through the painstaking task of weeding/planting natives.

Weeding operation around *Malva preissiana* (© G. Paczkowska).

Enchylaena tomentosa with fruits (© G. Paczkowska).

Overall it has become apparent that hand-weeding, and brushing of natives underneath cages is the most efficient way to revegetate the northern end of the island. Promising results include the growth of extensive covers of revegetated areas that have now been taken up by breeding bridled tern pairs which nest underneath, as the foliage provides shade and helps keep the birds and their broods cool in summer, while also helping them hide from predators.

Ongoing efforts to revegetate the areas of natives required a fair amount of fieldwork, and we would like to thank all the volunteers who have been contributing to the successful revegetation of Penguin Island. Efforts are ongoing.

6°) Rat eradication benefits seabirds and seabird-driven nutrient flows to tropical islands and coral reefs

Casey Benkwitt, Rachel Gunn, Matthieu Le Corre, Pete Carr & Nick Graham

Eradicating invasive rats from tropical islands can enhance native biodiversity, including seabirds. Because seabirds transport important nutrients from their offshore feeding grounds to island and coastal systems when they return to roost and breed, rat eradication and the subsequent return of seabird populations may have far-reaching benefits.

A Red-footed booby nesting on the beach of a rat-free island (© C. Benkwitt).

A healthy coral reef in the Indian Ocean (© C. Benkwitt).

We tested whether removing invasive rats from islands may restore these seabird-derived nutrient pathways, and estimated the magnitude, timing and spatial extent over which rat eradication affects tropical islands and coral reefs.

To do so, we compared 20 remote islands across the Indian Ocean (Scattered Islands and Chagos Archipelago) with different rat invasion histories and statuses: islands that never had invasive rats (rat-free), islands with rats removed 4-16 years earlier (rat-eradicated), and islands with invasive rats still present (rat-infested).

One of our research boats near a rat-free island with lots of seabirds (© C. Benkwitt).

Seabird biomass was lowest on rat-infested islands, intermediate on rat-eradicated islands, and highest on rat-free islands. On Île du Lys and Tromelin in the Scattered Islands, populations of breeding seabirds have been steadily increasing in the 15 years since rat eradication, and are now 8-10 fold higher than they were before rats were removed.

Rat eradication also restored key nutrient pathways to both tropical islands and nearby coral reefs, as we found 49-82% more seabird-derived nitrogen in terrestrial soil and leaves, and 15-34% more seabird-derived nitrogen in marine algae and fish on rat-eradicated compared to rat-infested islands. Importantly, these increased nutrient inputs extended at least 300 meters from shore. Many coral reefs are located within several hundred meters of shore, so are likely to be influenced by rat eradication.

The presence and return of seabird-derived nutrients to coral reefs is important in part because they can increase growth rates of corals and fish, as well as boost several measures of ecosystem function. However, we found no evidence that rat eradication enhanced growth rates of a small herbivorous damselfish, suggesting there may be a time lag in the recovery of some cross-ecosystem processes following rat eradication.

Still, these results are encouraging in that rat eradication can benefit both terrestrial and marine systems over relatively short timescales, even after hundreds of years of rat infestation. Pairing rat eradication with additional conservation measures, such as promoting native vegetation and actively restoring seabird populations, may quicken the full return of seabirds and their important nutrient subsidies.

Red-footed boobies providing many « nutrient subsidies » to the deck of our ship (© C. Benkwitt).

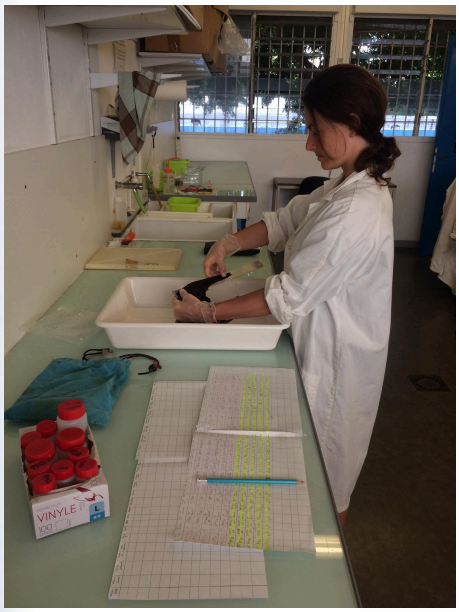
This work is now available online in Current Biology (Benkwitt et al. in press - https://doi.org/10.1016/j.cub.2021.03.104).

7°) Plastic in the ocean: from our bins to... seabirds

Margot Thibault

I began my PhD in January 2021 on the problematic of plastic pollution accumulated in the Indian Ocean gyre with the laboratory UMR ENTROPIE from the University of Reunion Island, the laboratory IMRCP from the University of Paul Sabatier Toulouse and The Ocean Cleanup (https://theoceancleanup.com/). Among my thesis axes, I will investigate the ingestion rate of plastic particles by three marine bioindicator species: the Loggerhead turtle, the Barau's petrel and the Tropical Shearwater (see IOSG Newsletter n° 6 and Cartraud *et al.* 2019).

Regarding seabirds, all samples that will be used for my thesis are dead birds found at Reunion Island. Petrels and shearwaters are attracted by urban lights and a large scale rescue program is conducted since 1996 by the Société d'Etudes Ornithologique de La Réunion (SEOR) to monitor the number of birds affected and find solutions to reduce the impacts (Le Corre *et al.* 2002). About 10% of the birds cannot be rescued and are used for scientific studies, including plastic pollution.



First seabird dissections (© N. Avargues).

Once in the laboratory, Naïs Avargues (SMAC team project) and I will extract the digestive tract to search for plastic particles. Marine litter will be collected, counted and weighted by categories, following the categories defined in the Marine Strategy Framework Directive (Galgani *et al.* 2013). The polymerization of plastic litter will be analysed by Raman spectrometry in UMR IMRCP.

Very soon, we will have more information!

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- Cartraud, A.E., Le Corre, M., Turquet, J., Tourmetz, J., 2019. Plastic ingestion in seabirds of the western Indian Ocean. Mar. Pollut.Bull.308–314. https://doi.org/10.1016/j.marpolbul.2019.01.065
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Call for contributions: This is the ninth newsletter of the Group. We plan to prepare the next issue for October 2021, so please send your articles to Sabine or Aurélie (see above) from now! ☺

Guidelines: articles sent should be around 300 words, written in English, with at least one photo (with credits) or figure to illustrate.