



3rd World Seabird Conference
October 4 – 8, 2021



#WSC3

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Table of Contents

Symposium Sessions	5
Symposium 1 – Conservation physiology in seabirds: Understanding mechanisms, causes and consequences in a changing world	5
Symposium 2 – Fine scale seabird foraging behavior in relation to fisheries.....	14
Symposium 3 – Unravelling fundamental processes in seabird ecology: The role of multi-colony studies	17
Symposium 4 – Marine renewables and seabirds: How can behavioural and ecological insights inform sustainable planning and development.....	33
Symposium 5 – Outcomes and progress of active seabird restoration projects	40
Symposium 6 – Heatwave impacts on marine birds.....	49
Symposium 7 – Adaptation and intervention as a climate response	60
Symposium 8 – Prey-mediated effects of environmental change on seabirds	63
Symposium 9 – Maintaining ecosystem services by seabirds – role of local and indigenous communities and cultures	68
Symposium 10 – The ecology of host-parasite interactions in seabirds: Combining approaches to understand eco-epidemiological dynamics and inform conservation decisions.....	70
Symposium 11 – Sea-ice and seabirds: An amphipolar perspective of the impacts on foraging and demography	73
Symposium 12 – Sensory Ecology: Foraging, reproduction and conservation	76
Symposium 13 – The importance of river plumes to seabirds and seabird prey	82
Symposium 14 – Seabird bycatch in commercial fisheries: Progress and challenges	85
Symposium 15 – Effects of wind and weather on seabird navigation, foraging and energetics.....	93
Symposium 16 – Applications of genomics to seabird conservation	98
Symposium 17 – The threat of marine debris to seabirds: Disentangling the demonstrated from the perceived.....	105
Individual Paper Sessions.....	109
Foraging Ecology I	109
Tracking I.....	112
Behavior I	117
Foraging Ecology II	121
Tracking II.....	124
Behavior II, Genetics I	126
Foraging Ecology III	129

Behavior III, Genetics II	133
Tracking III.....	134
Conservation I	136
Biology & Breeding/Non-Breeding Biology I.....	139
Conservation II	142
Biology & Breeding/Non-Breeding Biology II.....	145
Conservation III	147
Biology & Breeding/Non-Breeding Biology III.....	150
Conservation IV.....	153
Conservation V, Diseases/Parasites I, Physiology I, & General.....	157
Monitoring I, Demography & Surveys I.....	161
Fisheries Interaction I.....	166
Demography & Surveys II, Diet I	169
Monitoring II	173
Disease/Parasite II, Physiology II, Diet II	176
Monitoring III, Demography & Surveys II.....	179
Fisheries Interaction II.....	180
Climate & MPA I.....	182
Pollution I	187
Predation & Restoration I	191
Climate & MPA II.....	192
Pollution II, Predation & Restoration II.....	194
Poster Session Atlantic 1.....	198
A – Behavior	198
B – Biology/Breeding Biology/Nonbreeding Biolog.....	201
C – Bycatch.....	204
D – Climate change	206
E – Conservation	207
F – Demography.....	209
G – Diet	211
I – Fisheries interactions	213
J – Foraging ecology	215
K – Miscellaneous	220

L – Physiology.....	224
M – Pollution.....	226
N- Surveys	229
O –Tracking	231
Poster Session Pacific 1.....	234
A – Behavior	234
B – Biology/Breeding Biology/Nonbreeding Biology	236
C – Bycatch.....	236
D – Climate change	237
E – Conservation	238
H – Diseases/Parasites	239
J – Foraging ecology	240
K – Miscellaneous	240
Poster Session Atlantic 2.....	242
A – Behavior	242
B – Biology/Breeding Biology/Nonbreeding Biology	246
C – Bycatch.....	249
D – Climate change	251
E – Conservation	252
F – Demography.....	255
G – Diet	256
H – Diseases/Parasites	258
I – Fisheries interactions	259
J – Foraging ecology	260
K – Miscellaneous	265
L – Physiology.....	268
M – Pollution.....	269
O –Tracking	273
Poster Session Pacific 2.....	276
N- Surveys	276
B – Biology/Breeding Biology/Nonbreeding Biology	278
D – Climate change	280
E – Conservation	281

G – Diet 282
K – Miscellaneous 283
M – Pollution..... 284
P - Surveys..... 285

such times of limited food supply Wilson's storm-petrel chicks can minimize their energy expenses by heterothermy: reducing their metabolism and body temperature. As heterothermy is reported to impact development, time spent hypotherm could have negative impacts for their future lives. A proposed consequence is that chicks are forced to fledge in poorer body conditions because of decreased time for development. Here we show the first results of our study of heterothermy and its consequences in a breeding colony of Wilson's storm-petrels at King George Island, Antarctic Peninsula. We investigated the impact of hypothermia on different parameters concerning chick development like blood fat values, immunology, telomere shortening, and growth. Triglyceride plasma values fell with increasing time spent at colder body temperatures within the last days before sampling. However, immune response to a phytohaemagglutinin test were not different in chicks that experienced more frequent hypothermic events than those that always maintained a constant body temperature. As snowfall is predicted to increase on the Antarctic Peninsula due to climate change, the use of heterothermy may ensure chick survival during continuous events of food limitation. The impact of heterothermy on their development and survival may hence become of high importance on the long term for the well-being of colonies breeding in this area.

M – Pollution

1A-M-55: Foraging area rather than trophic level explains mercury concentration in Patagonian rockhopper penguin colonies

Authors: Nicolas Lois¹, Ulises Balza², Samanta Dodino², Michael Polito³, Klemens Pütz⁴, Rebecka Brasso⁵, Andrea Raya Rey²

¹Universidad de Buenos Aires, ²CONICET - Centro Austral de Investigaciones Científicas, ³Louisiana State University, ⁴Antarctic Research Trust, ⁵Weber State University

Mercury (Hg) is a widely available pollutant in the world's oceans. Its distribution is far from homogenous showing vertical stratification in the water column as well as spatial heterogeneity within and among ocean basins. In the Southern Ocean, penguins are considered effective indicators of Hg in the marine food web because of their relatively high trophic level, vagility combined with discrete and rather accessible reproductive grounds and their unusual feather molting pattern allowing for specific time-integrated sampling. Previous studies have shown elevated Hg concentrations in the South Western Atlantic Ocean. To provide further insights on regional variation in Hg prevalence within this basin we measured Hg concentration and carbon and nitrogen stable isotope composition in feathers of southern rockhopper penguins (*Eudyptes chrysocome*). Rockhopper penguins present population genetic structure in this area and different foraging areas for each genetic cluster. The northern genetic cluster forages at a higher trophic position, but yielded a two- to three-fold lower Hg concentration than the southern one. Interestingly, all adults from the southern cluster exceed the feather toxicity threshold of 5 µg/g. Previous studies also show that the Northern Patagonian Shelf presents lower concentrations compared to southernmost South America, which implies a recurring pattern rather than a particularity. This implies a different vulnerability due to the exposure to Hg for each cluster, but especially for predators feeding on rockhoppers, i.e. marine top predators, gulls and caracaras. Southern colonies could therefore serve as a model to investigate adverse effects of Hg contamination on penguins and downstream in their food webs.

1A-M-56: Blood mercury concentration is related to body condition, breeding success and trophic ecology in Brown Skuas (*Stercorarius antarcticus*)

Authors: Andrés Ibañez¹, William Mills², Paco Bustamante³, Lara Morales⁴, Diego Torres⁴, Facundo

Palacio⁴, Nadia Haidr¹, Rocío Mariano-Jelicich⁵, Richard Phillips⁶, Diego Montalti⁴

¹La Plata Museum, ²University of Exeter/British Antarctic Survey, ³CNRS-La Rochelle Université, ⁴La Plata Museum (FCNyM-UNLP), ⁵UNMdP-CONICET, Universidad Nacional de Mar del Plata, ⁶Cambridge University

Mercury (Hg) is a pervasive environmental pollutant that affects seabirds' physiology with short- and long-term fitness consequences. Brown Skuas (*Stercorarius antarcticus*) are opportunistic top predators and scavengers, and therefore are effective bioindicators of contamination. We measured total mercury (THg) concentration and the stable isotopes of carbon ($\delta^{13}\text{C}$, a proxy of feeding habitat) and nitrogen ($\delta^{15}\text{N}$, a proxy of trophic position/diet) in blood from breeding adult Brown Skuas at Esperanza/Hope Bay (Antarctic Peninsula) ($N=49$). The aim of the study was to evaluate the influence of individual traits (body condition and sex) and foraging ecology ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values) on Hg exposure, and to determine the relationship between THg concentration with body condition and breeding success. We fitted general linear models, and the most parsimonious model included sex, sampling date, breeding season, body condition and $\delta^{15}\text{N}$ as variables. Mean \pm SD THg concentration in blood was $0.82 \pm 0.36 \mu\text{g g}^{-1}\text{dw}$, and was higher in males ($N=25$, $0.89 \pm 0.38 \mu\text{g g}^{-1}\text{dw}$) than in females ($N=24$, $0.75 \pm 0.33 \mu\text{g g}^{-1}\text{dw}$). Adults with higher THg showed lower body condition, and in females, also lower breeding success. In addition, a positive association was observed between THg concentration and $\delta^{15}\text{N}$ reflecting bioaccumulation from prey. Males showed higher THg loads than females, probably because females can deposit Hg in eggs, which may explain why females with higher THg were less likely to fledge chicks. Together, these results indicate that Hg has deleterious effects on reproduction in adult skuas, with potential long-term repercussions at the population level.

1A-M-57: Ventral feathers contained the highest mercury level in brown booby (*Sula leucogaster*), a pantropical seabird species

Authors: Gabriel Bighetti¹, Janeide Padilha¹, Larissa Cunha¹, Olaf Malm¹, Patrícia Mancini¹

¹Federal University of Rio de Janeiro

Seabirds are extensively used as environmental biomonitors and feathers are among the most analyzed matrices because they are one of the main excretory pathways to detoxify the bird's body of environmental contaminants. Still, there is a variation in contamination level between the different feathers of seabird species, driven by diet and physiology, such as molt strategy and feather formation sequence. We measured total mercury (THg) concentration in different types of feathers (wing, tail, ventral and dorsal) of the same individual in adults and juveniles of brown boobies (*Sula leucogaster*) from the northern coast of Rio de Janeiro state, Brazil. Brown booby adults and juveniles had higher THg concentration ($\mu\text{g.g}^{-1} \text{d.w.}$) in wing and ventral feathers compared to dorsal and tail feathers. This difference may be explained by the fact that feathers grow in a specific sequence during molts leading to different THg concentrations in each type of feather. Additionally, juveniles had significantly lower concentrations of THg than adults in all feather types, which may be explained by the shorter life span, leading to less time to bioaccumulate Hg in their body. It is essential to choose carefully which feather type is more suitable to be used as a biomonitor of THg contamination in a particular species. For brown boobies, we suggest the use of ventral feathers, which represent the highest Hg concentration, are easy to sample and do not impair the seabird's flight ability.

1A-M-58: Are microplastics accumulating in the foodweb of the endangered Galápagos Penguin, *Spheniscus mendiculus*? Modelling microplastics bioaccumulation and biomagnification potential in