

NOTA CIENTÍFICA

Presentado: 25/03/2019
Aceptado: 20/12/2019
Publicado online: 25/05/2020
Editor:

Autores

Diego García-Olaechea* ^{1,2}
diego.garcia@ufl.edu
<https://orcid.org/0000-0002-5585-6880>

César Chávez-Villavicencio ³
cchavez@ucn.cl
<https://orcid.org/0000-0003-2185-8308>

Jorge Novoa-Cova ²
jojunoco@corbidi.org

Correspondencia

*Corresponding author

1 Department of Wildlife Ecology and Conservation.
University of Florida. Gainesville, FL 32611-0430, USA.

2 División de Ornitología. Centro de Ornitología y
Biodiversidad - CORBIDI. Santa Rita 105 – 202, Huertos
de San Antonio. Lima 33, Perú.

3 Programa de Doctorado en Biología y Ecología Apli-
cada. Universidad Católica del Norte. Larrondo 1281,
Guayacán. Coquimbo, Chile

Citación

García-Olaechea D, Chávez-Villavicencio C, Novoa-
Cova J. 2020. A new breeding colony of the
Wedge-rumped Storm-Petrel (*Hydrobates
tethys kelsalli*, Lowe 1925) on Foca Island,
northern of Peru. *Revista peruana de bio-
logía* 27(2): 225- 228 (Mayo 2020). doi:
<http://dx.doi.org/10.15381/rpb.v27i2.15497>

Una nueva colonia reproductiva de la golondrina de tempestad peruana (*Hydrobates tethys kelsalli*, Lowe 1925) en Isla Foca, norte del Perú

A new breeding colony of the Wedge-rumped Storm-Petrel (*Hydrobates tethys kelsalli*, Lowe 1925) on Foca Island, extreme Northwestern Peru

Resumen

Las colonias reproductoras de golondrina de tempestad son poco conocidas y difíciles de encontrar debido a que estas especies anidan en grietas, madrigueras y dentro de cuevas ubicadas en islas. En la última década, se reportaron algunos sitios de reproducción de Golondrina de Tempestad Peruana (*Hydrobates tethys kelsalli*) en islas cercanas al centro de Perú y norte de Chile. En este trabajo se presenta el hallazgo de la colonia reproductora ubicada más al norte de esta subespecie, en la Isla Foca (noroeste peruano). En abril de 2006 se registraron 28 nidos, de los cuales el 46% tenían crías y el 54% huevos. Los nidos consistían en pequeñas hoyos en la roca sin ningún tipo de material para su construcción. La temporada de anidación coincidió con la de otras zonas reproductivas encontradas en la costa peruana. Estos resultados contribuyen al conocimiento de la distribución de las colonias reproductivas de esta subespecie en la costa peruana.

Abstract

Breeding colonies of Storm-petrels (family Hydrobatidae) are poorly known and can be difficult to find because they typically nest on islands in crevices and burrows inside caves. In the past decade, some breeding locations of the Wedge-rumped Storm-petrel (*Hydrobates tethys kelsalli*) have been reported on islands off central Peru and northern Chile. Here we report the northernmost breeding colony of this subspecies from Isla Foca, northern of Peru. In April 2006 we found 28 nests, of which 46% had chicks and 54% had eggs. Nests consisted of small holes in the rock with no nest material used for construction. Nesting season coincided with that of other reproductive zones found on the Peruvian coast. These results contribute to the knowledge of the distribution of reproductive colonies of this subspecies on the Peruvian coast.

Key words:

Biología reproductiva; Corriente de Humboldt; anidamiento en islas; golondrina de tempestad; *Hydrobates tethys kelsalli*.

Keywords:

Nesting in islands; Reproductive biology; Humboldt Current; Tempest swallow; *Hydrobates tethys kelsalli*.

Introduction

The Wedge-rumped Storm Petrel is native to the tropical eastern Pacific Ocean (Harrison 1936). Two subspecies are recognized, including *Hydrobates tethys tethys*, which nests in the Galapagos Islands (Murphy 1983), and *Hydrobates tethys kelsalli*, which breeds on islands off Peru and Chile (Murphy 1936, Ayala and Sánchez-Scaglioni 2007, Bernal et al. 2006). During the non-breeding season, it ranges as far north as Mexico and California, and south to northern Chile (Carboneras et al. 2014). *Hydrobates tethys kelsalli* is the smaller of the subspecies, particularly with regard to wing length (Murphy 1936).

Storm petrel (Hydrobatidae) reproduction along the southeastern Pacific coast is poorly known. They usually nest on islands, building nests in burrows and crevices along cliffs and stone walls, and returning to breeding areas at night (Torres-Mura & Lemus 2013). However, in the past decades, new reproductive colonies of some species of this family (including *H. t. kelsalli*) have been discovered along the Peruvian and Chilean coast (Ayala & Sanchez-Scaglioni 2007, Hertel & Torres-Mura 2003, Torres-Mura & Lemus 2013, Jahncke 1993).

Colonies of *H. t. kelsalli* were first discovered in 1913 in Pescadores and San Gallan Islands off the central coast of Peru (Murphy 1936), but there were no additional records of their reproduction for many years. Simeone et al. (2003) found this species nesting on Grande Island in northern Chile, considerably expanding the southern limit of its known breeding range. In Peru, four nesting areas have been reported for this species: in Chao and Corcovado islands off the coast of La Libertad (Ayala et al. 2004), on Ferrol Island (Ayala & Sánchez-Scaglioni 2007), and Santa Island (Ayala et al. 2008), near Chimbo-te, Ancash, central Peru.

In this note we systematize the records of the nesting sites of *H. t. kelsalli* on the Peruvian coast and describe a new nesting colony on Foca Island from northern of Peru. In addition, we compare the morphometry of *H. t. kelsalli* adults nesting in Peru with the published morphometry of *H. t. tethys* nesting on the Galapagos Islands.

Methods

Foca Island (5°12'S, 81°12'W) is located in the province of Paita in Piura region, northwestern Peru. It is located approximately 800 m from the mainland, near the fishing town La Islilla, 20 km southwest of the city of Paita (Fig. 1). The island has an area of 92 ha and is located within the convergence zone of the Humboldt Current and the Equatorial Current, which favors the presence of species associated with both warm and temperate water (Novoa et al. 2010).

In two visits made in April 2006, we carried out intensive searches within the accessible caves and cliffs of the island, between 10:00 and 17:00 hrs. Nests with eggs, chicks, or at least one parent in the incubation position were considered active. With a caliper, we measured the length of wing, culmen, and tarsus of five adults of unknown sex. The mean of these metrics was compared

with the means reported by Murphy (1936), Ayala et al. (2004) and Ayala et al. (2008) using the 95% confidence interval through its standard deviations with program R (R Core Team 2017).

Results and discussion

We found 28 active nests, of which 13 (46%) contained eggs and 15 (54%) contained chicks. According to the incubation period of this subspecies (Carboneras et al. 2014), the eggs and chicks found in mid-April suggests that it begins to lay eggs in mid-March, similar to the results of Ayala and Sánchez-Scaglioni (2007) on Ferrol Island. However, in Chao and Corcovado Islands (Ayala et al. 2004), the first chick was found in May, while in Chile, Bernal et al. (2006) found that egg-laying occurs at the end of December. This suggests that this subspecies could have at least two breeding seasons in a year, supported by the uniform marine productivity of the coastal upwelling system of the Humboldt Current throughout the year.

With this record, the number of known nesting sites of *H. t. kelsalli* rises to eight on the Peruvian coast (Table 1). However, it is likely that there are additional unexplored sites in Peru and Chile where this subspecies could nest. In Peru, numerous islands and islets have not explicitly been explored for breeding colonies of this species, although they meet the required habitat conditions for nesting. The inaccessibility of its breeding sites is beneficial for the conservation of the species, as well as the protection provided by the fact that these islets and islands are part of the System of Guano Islands, Islets and Points National Reserves of the Peruvian state.

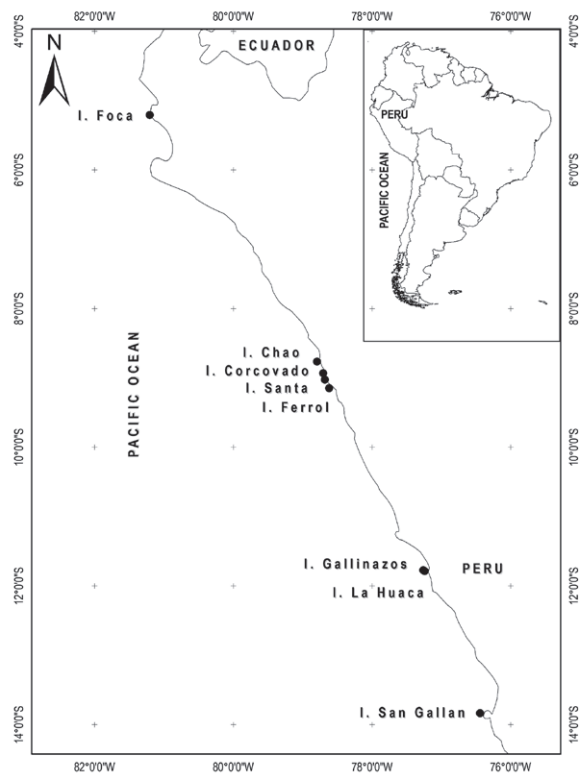


Figure 1. Location of know breeding colonies of *Hydrobates tethys kelsalli* in the islands' system in Peru.

Table 1. Systematization of the nesting sites location of *Hydrobates tethys kelsalli* in Peru.

Región	Island	Coordinates	Active nests	Nests with eggs	Nests with chicks	Source
Piura	Foca	5°12'S/81°12'W	28	13	15	This study
Ancash	Chao	8°46'S/78°47'W	42	35	7	Ayala et al. 2004
	Corcovado	8°56'S/78°42'W	45	25	20	Ayala et al. 2004
	Santa	9°01'S/78°40'W	407	92	7	Ayala et al. 2008
	Ferrol	9°08'S/78°38'W	176	87	55	Ayala & Sánchez-Scaglioni 2007
Lima	Gallinazos	11°46'S/77°15'W	?	?	?	Murphy 1936
	La Huaca	11°47'S/77°14'W	?	?	?	Murphy 1936
Ica	San Gallan	13°50'S/76°26'W	?	?	?	Murphy 1936

The nests on Foca Island were found in natural cracks and crevices between rocky walls (Fig. 2), similar to what was found in Pescadores and San Gallán islands (Murphy 1936). However, Ayala et al. (2004) and Ayala and Sánchez-Scaglioni (2007) found that this subspecies will nest in human-made stone walls built at the beginning of the last century on guano islands to increase guano deposition.

Based on the 95% confidence intervals of the mean morphometry of the specimens of Foca Island and those existing for other islands of Peru (Table 2), we established that there is no evidence of differences in mean length of the wing and tarsus (Fig. 3). Mean culmen length of

the specimens from Chao Island showed strong evidence of being greater than the mean length of the culmen of the specimens from the Foca and Ferrol islands (Table 2, Fig. 3). Although we cannot establish differences with the mean of the metrics of *H. t. tethys* of the Galapagos Islands (standard deviation is not reported in their records), it seems that the wing of this subspecies could be greater than the mean of the wing of *H. t. kelsalli* (Fig. 3). Regarding the culmen and tarsus, no differences could be established.

These results contribute to the knowledge of the distribution of the reproductive colonies of this subspecies on the Peruvian coast and morphometric aspects.

Table 2. Comparison of the means of the Wing, Culmen and Tarsus metrics of *Hydrobates tethys kelsalli* and *Hydrobates tethys tethys* on the islands where their nesting was recorded. Parentheses show 95% confidence interval.

Subspecie	Island	Wing	Culmen	Tarsus	N
<i>H. t. kelsalli</i>	Foca	125.8 (124.8 – 126.8)	10.9 (10.5 – 11.3)	21.8 (20.7 – 22.9)	5
	Ferrol	125 (121.1 – 128.9)	11.3 (11.2 – 11.4)	21.4 (21.0 – 21.8)	7
	Chao	123 (120.9 – 125.1)	12.1 (11.9 – 12.3)	21.7 (20.9 – 22.5)	6
	Grande	126.9 (125.3 – 128.5)	11.7 (11.4 – 12.0)	22.2 (21.8 – 22.6)	9
	Pescadores	123.9	11.7	21.5	12
<i>H. t. tethys</i>	Galapagos	134	12.9	22.8	14

**Figure 2.** *Hydrobates tethys kelsalli* nesting in Foca Island, Piura, extreme Northwestern of Peru.

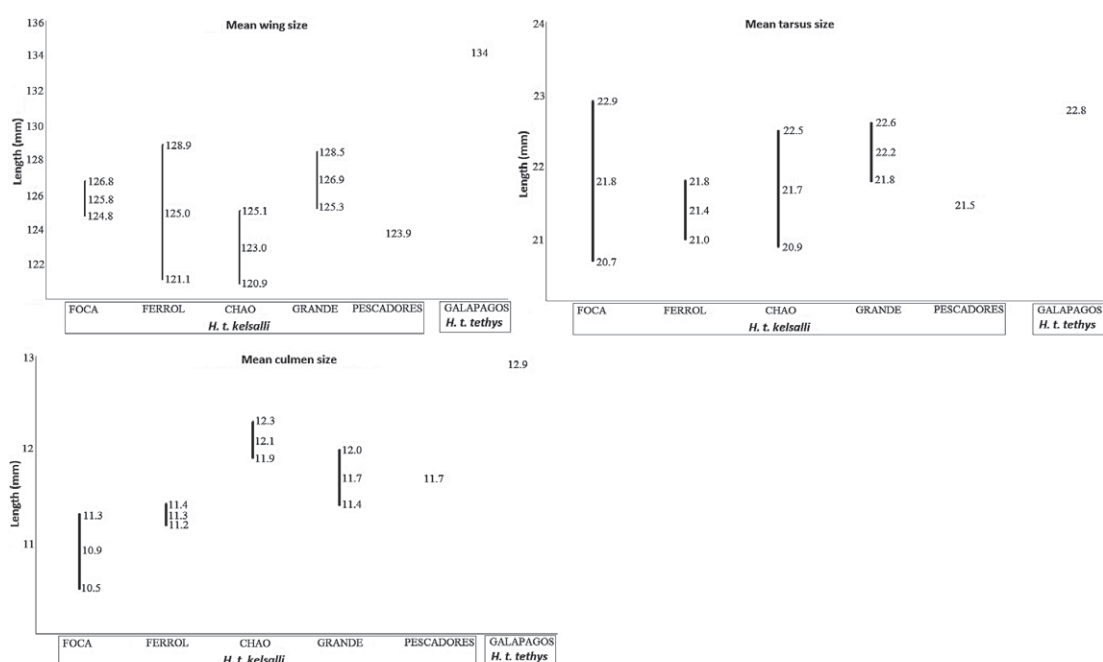


Figure 3. Comparison between the mean of wing, tarsus and culmen size metrics of *Hydrobates tethys kelsalli* and *Hydrobates tethys tethys*.

Literature cited

- Ayala L, Sánchez-Scaglioni R. 2007. A new breeding location for the Wedge-rumped Storm-Petrel *Oceanodroma tethys kelsalli* in Peru. *Journal of Field Ornithology* 78(3): 303-307. <https://doi.org/10.1111/j.1557-9263.2007.00106.x>.
- Ayala L, Mendoza C, Pérez J. 2004. Two new breeding localities for the Wedge-rumped Storm-Petrel *Oceanodroma tethys kelsalli* in Peru. *Marine Ornithology* 32: 107-108.
- Ayala L, Sánchez-Scaglioni R, Amorós S, Felipe L. 2008. A breeding colony of Wedge-rumped Storm-Petrel, *Oceanodroma tethys kelsalli* (Lowe 1925), on Santa Island-Peru. *Revista Peruana de Biología* 15 (1): 117-120. <https://doi.org/10.15381/rpb.v15i1.1687>
- Bernal M, Simeone A, Flores M. 2006. Breeding of Wedge-rumped Storm-Petrel (*Oceanodroma tethys*) in northern Chile. *Ornitología Neotropical* 17: 283-287.
- BirdLife International (on line). 2018. Species factsheet: *Hydrobates tethys*. Accessed 12 march 2018. <http://www.birdlife.org>.
- Carboneras C, Jutglar F, Kirwan GM. 2014. Wedge-rumped Storm-petrel (*Hydrobates tethys*). In: del Hoyo J, Elliott A, Sargatal J, Christie DA, de Juana E, editors. *Handbook of the Birds of the World Alive*. Barcelona (Spain) Lynx Edicions.
- Harrison PC. 1983. *Seabirds: an identification guide*. Houghton Mifflin, Boston, MA.
- Jahncke J. 1993. Primer informe del área de anidación de la golondrina de tempestad negra *Oceanodroma markhami* (Salvin 1883). *Proceedings of X Congreso Nacional de Biología*, 1992. Lima (Peru) pp. 339-343.
- Murphy RC. 1936. *Oceanic birds of South America, volume II*. The Macmillian Company, New York, NY.
- Novoa J, Hooker Y, García-Olaechea A. 2010. *Isla Foca, Guía de Fauna Silvestre. Primera Edición. Naturaleza y Cultura Internacional - CONCYTEC. Piura-Perú*. 112 pp.

R Core Team. 2017. R: A Language and Environment for Statistical Computing. <https://www.R-project.org/>

Simeone A, Luna-Jorquera G, Bernal M, Garthe S, Sepúlveda E, Villablanca R, Ellenberg U, Contreras M, Muñoz J, Ponce T. 2003. Breeding distribution and abundance of seabirds on islands off north-central Chile. *Revista Chilena de Historia Natural* 76: 323-333. <http://dx.doi.org/10.4067/S0716-078X2003000200016>

Torres-Mura J, Lemus ML. 2013. Breeding of Markham's Storm-Petrel (*Oceanodroma markhami*, Aves: Hydrobatidae) in the desert of northern Chile. *Revista Chilena de Historia Natural*, 86 (4): 497-499. <https://doi.org/10.4067/S0716-078X2013000400013>

Agradecimientos / Acknowledgments:

We thank Mario Lozada and Alberto Morán for helping with the field work, Audrey Wilson and Thomas Smith for early reviews of this draft. We also thank the anonymous reviewers for improving the manuscript.

Conflicto de intereses / Competing interests:

The authors declare no conflict of interest.

Rol de los autores / Authors Roles:

DGO que realizó trabajo de campo y redacción del manuscrito. CCV que realizó trabajo de campo, redacción del manuscrito, estadística y SIG. JNC que realizó trabajo de campo y redacción del manuscrito.

Fuentes de financiamiento / Funding:

The authors declare, this work not received specific funding.

Aspectos éticos / legales; Ethics / legals:

There are no ethical or legals aspects to declare since it is a review.