SUB-ANTARCTIC MAGELLANIC ORNITHOLOGY

First Decade of Bird Studies at Omora Ethnobotanical Park: Cape Horn Biosphere Reserve

Ricardo Rozzi & Jaime E. Jiménez

Magellanic Sub-Antarctic Ornithology

First Decade of Long-Term Bird Studies at the Omora Ethnobotanical Park, Cape Horn Biosphere Reserve, Chile

Ricardo Rozzi and Jaime E. Jiménez

Editors

SUB-ANTARCTIC BIOCULTURAL CONSERVATION PROGRAM

University of North Texas - Universidad de Magallanes

Library of Congress Cataloging-in-Publication Data

Magellanic Sub-Antarctic Ornithology: First Decade of Long-Term Bird Studies at the Omora Ethnobotanical Park, Cape Horn Biosphere Reserve, Chile / Ricardo Rozzi & Jaime E. Jiménez, editors. -- First edition.

pages cm

"Sub-Antarctic Biocultural Conservation Program. University of North Texas -- Universidad de Magallanes."

Includes bibliographical references and index.

ISBN 978-1-57441-531-5 (pbk. : alk. paper) -- ISBN 978-1-57441-543-8 (ebook)

1. Birds--Chile--Cabo de Hornos Biosphere Reserve. 2. Forest birds--Habitat--Chile--Parque Etnobotánico Omora. 3. Habitat surveys--Chile--Parque Etnobotánico Omora. 4. Biodiversity--Chile--Cabo de Hornos Biosphere Reserve. 5. Endangered species--Chile--Cabo de Hornos Biosphere Reserve. 6. Birds--Conservation--Chile--Cabo de Hornos Biosphere Reserve. 7. Animal ecology--Chile--Cabo de Hornos Biosphere Reserve. 8. Parque Etnobotánico Omora (Chile) 9. Cabo de Hornos Biosphere Reserve (Chile) 10. Parque Etnobotánico Omora (Agency : Chile) I. Rozzi, Ricardo, 1960- editor of compilation. II. Jiménez, Jaime E., 1960- editor of compilation. III. Sub-Antarctic Biocultural Conservation Program. IV. Parque Etnobotánico Omora (Agency : Chile)

QL695.2.S83 2013

333.95'8160983--dc23

2013038603

6 INTRODUCTION TO THE SINGULARITIES OF THE MAGELLANIC SUB-ANTARCTIC AVIFAUNA

Sebastián Dardanelli, Jaime E. Jiménez, Rodrigo A. Vásquez, and Christopher Elphick

The study of aspects of the basic biology of the species provides valuable information for the development of strategies for their conservation and their habitats, and to build links between humans and these species. Several authors (Soule & Kohn 1988, Primack 1993, Wiens 2007) point out that the cornerstone of the development of any program of conservation of species or habitats is the knowledge of their basic biology. This aspect is crucial, since the responses of each species to processes such as habitat loss and climate change are always "species-specific" (Lindenmayer & Fischer 2006). In addition, some species in the southern hemisphere, particularly understudied passerine families inhabiting the neotropics that are found in sub-Antarctic areas (*i.e.*, high latitudes of the southern hemisphere), such as several species of the family Tyrannidae and Furnariidae, among others, have unique biological characteristics and are very different from passerine species inhabiting high latitudes of the northern hemisphere (see *e.g.* Moreno *et al.* 2005, Moreno *et al.* 2007).

The Cape Horn Biosphere Reserve (CHBR) houses the world's southernmost forests where the birds are the dominant group of vertebrates. This is why the Omora Park prioritized the long-term study of birds in the CHBR, developing since 2000, a program of monitoring land birds. The program consists of bird banding in forests and scrublands, as well as tracking the population dynamics through the implementation of fixed points of capture, recapture, and release. Through the analysis of the results of this banding program, we are starting to learn the basic ecology of the almost unknown species that inhabit the sub-Antarctic forests.

This section reprints seven articles published in various journals between 2004 and 2008, which deal with very different aspects of the basic biology of sub-Antarctic birds from autoecology, behavior and migration patterns, diets to the study of latitudinal gradients of their blood parasites. These varieties of articles have been collected in one section called "singularities."

The owls of the genus *Strix* inhabit mainly forests on all continents except Antarctica (del Hoyo *et al.* 1999). Their affinity for forest environments and their frequent sensitivity to alterations of forests makes them good indicators of environmental health of forests and prey availability in those habitats. The best known case is that of the Northern Spotted Owl (*Strix occidentalis caurina*), from the forests of northwestern United States (Hunter & Gibbs 2007). In the first paper of this section, Ippi and Rozzi (2004) provide relevant data on the Rufous-legged Owl (*Strix rufipes*), a medium-sized owl (38 cm body length) endemic to the temperate forests of Chile and Argentina. Despite being considered a crepuscular or nocturnal owl, the authors have revealed the diurnal activity of this species. The Rufous-legged Owl was recorded not only moving in the forest, but hunting during the day. Also notable are the observations on its feeding behavior, including the use of small birds as prey. These facts were confirmed after the publication through daytime observations of activity of several individuals on the island and the capture of two individuals who tried to take small birds caught in mist-nets during the monthly long-term monitoring in the Omora Park (S. Dardanelli, personal observation).

The second paper of this section discusses a migratory species, albeit of short distance, of limited distribution and abundance. McGehee *et al.* (2004) reported the records of the Patagonian Tyrant (*Colorhampus parvirostris*) on Navarino Island. Additionally, the authors analyze the presence of this species in these high latitudes between the months of March and April, corresponding to the post-breeding period of the species. The authors propose an interesting discussion on the presence of *C. parvirostris* in the Cape Horn region, suggesting that this species may have expanded its range to the south in recent years, which could be associated with the phenomenon of climate change. Moreover, considering that they were sighted after the reproductive period, suggests that their presence could be due to southern movements toward high latitudes shortly before starting again northward migration, which is known as "reverse post-reproductive migration." This would be the first reported case of this behavior in the sub-Antarctic forests. However, it is noteworthy that after the publication of this study, we were able to observe the presence of *C. parvirostris* for most of the year except between October and December (Ippi *et al.* 2009, S. Dardanelli, personal observation). This suggests that some individuals may behave as residents and others as migrants. Based on this evidence, *C. parvirostris* seems to have a partially migratory population. This could be a recent strategy acquired by the population in Navarino Island. Alternatively, given the rarity of this species throughout its range, it has non been detected in Navarino in the Fall before 2004. These new questions encourage the development of further studies to confirm, for example, the nesting of the species in the southernmost forests.

Studies on the autoecology of bird species are essential to know the species and preserve them, and to conserve the ecosystems they inhabit (Lindenmayer & Fischer 2006, Wiens 2007). The third article in this section (Brown *et al.* 2007) deals with the study of the autoecology of *E. albiceps*. The authors help us understand more about a migratory species that breeds in subtropical and temperate southern South American forests and thickets, and winters in tropical forests of northern South America. This paper contains valuable information about the longevity of *Elaenia albiceps*, information which is only possible to obtain from long-term studies. There is a widespread ignorance about the longevity of birds in the wild, particularly in the southern hemisphere; this information is relevant to know the life history of a species and to model the dynamics of their populations over time. Thus, it is possible to predict changes in population behavior as compared to habitat degradation or climate change. Besides contributing to the knowledge of the autoecology of the species, the recording of the dates of arrival and departure of individuals of *E. albiceps* to and from Navarino Island is useful to detect marked changes in the phenology of migration, which can be used as an indicator of changes associated with climate change. For example, some migrants advance or delay their arrivals and departures as a response to changes in rainfall and temperature patterns (Jenni & Kéry 2003, Both 2010).

Unraveling the trophic relationships of species in an ecosystem is crucial to understand the distributions and abundances of organisms. These also determine the flows of energy and nutrients, and ultimately the ecosystem functioning. The diet of the sub-Antarctic birds has hardly been studied. The following two papers describe the diet of the Patagonian Sierra-Finch (*Phrygilus patagonicus*) and of three other bird species that feed on the Leñadura tree (*Maytenus magellanica*). In this way, McGeehe & Eitnier (2007), based on behavioral observations, describe that the Patagonian Sierra-Finch feeds on seeds of eight plant species, on the nectar of three, on floral parts of five, and on fruits of four, in addition to the Old-man's Beard lichen (*Usnea* spp.). This wide trophic spectrum of the most abundant bird of the southern forests likely relates closely with trees (three species), shrubs (five species), and grasses of small plants (six species), fulfilling complex roles as a predator of fruits, seeds, and flowers, and as a pollinator of forest species. It is interesting to note that the Sierra-Finch is not a seed disperser, as the seeds eaten are destroyed in its passage during digestive tract. It would also be interesting to know what the Patagonian Sierra-Finch feed on during the winter, as it is a resident bird and no dietary observations during the cold period have been reported.

In the fifth paper presented, McGeehe (2007) documented interesting observations in which three essentially insectivorous bird species (two of which are of the flycatchers family) eat seeds and fruits of a shrub, the Leñadura that has been decimated by cattle grazing. Despite the fact that these observations seem unique, it is likely that this behavior of insectivorous birds could be more widespread than believed, and that it will be better documented with more detailed observations of sub-Antarctic birds. The author suggests that these unexpected trophic behaviors may result from a decline in the environmental availability of insects due to adverse weather conditions in the fall, when these observations were made. However, it remains to be seen if these birds play a role in dispersing seeds of this commomn shrub of the southern region, and whether these behaviors are repeated in more northern populations of these bird species.

Since 2004, a program to monitor the reproductive biology of birds that nest in cavities began. This study was conducted by installing nest boxes in the Omora Park and surrounding areas, and was linked to investigations initiated earlier in Chiloé (see Moreno *et al.* 2005). Species that have predominantly used nest boxes in Navarino are the House Wren (*Troglodytes aedon*) and the Thorn-tailed Rayadito (*Aphrastura spinicauda*). The latter species, a member of the Furnariidae family, has proven to be a particularly interesting species by being abundant in temperate forests and by possessing unique characteristics related to sexual dimorphism and reproductive behavior. The sixth paper in this collection corresponds to Moreno *et al.* (2007), who studied the sexual dimorphism and parental care of the Thorn-tailed Rayadito in Chiloé and in Navarino. The authors show that males and females are morphologically similar, differing only in body size, with males being 2 to 10% larger than females. In addition, the parental care of eggs and chicks is generally shared by adult males and females, collaborating both in incubation, feeding the chicks, and cleaning the nest. This type of bi-parental care, associated with other unique features of the species at this latitude, such as having low annual fecundity, large egg size relative to other passerines, and an extended growth period (Moreno *et al.* 2005), suggest that the Thorn-tailed Rayadito is a singular species that deserves further research on various aspects of its biology.

There is a marked asymmetry between the knowledge of the existence of latitudinal gradients in species diversity among free-living organisms and their parasites, with many studies for the former and lack of studies on the latter (Hillebrand *et al.* 2001). This lack of studies on latitudinal gradients of parasites is even more marked in the southern hemisphere (Merino *et al.* 2008). In the seventh paper of this section, Merino *et al.* (2008) provide valuable information on the latitudinal gradients of richness and abundance of lineages of bird blood parasites. The authors describe latitudinal gradients for the prevalence of the three parasite genera (*Leucocytozoon*, *Haemoproteus*, and *Plasmodium*) as well as for mixed infections. They also suggest that some lineages have evolved in isolation in some localities and/or species. It is remarkable that the genus *Haemoproteus* always had hosts of the family Emberizidae. Individuals of White-crowned Elaenia (*E. albiceps*), a long-distance migratory species, were found infected by the same parasite lineages in locations separated by 20° of latitude. Infections by these lineages were recorded in other non-migratory species, so the authors suggest that long distance migratory birds could prevent latitudinal gradients in parasites due to the potential role of these migratory birds in the spread of diseases to other species.

In short, the study of these singularities of sub-Antarctic avifauna provides valuable information that helps understand the basic biology of almost unknown species. The value of these data becomes even more important when considering that, in analyzing large databases

and comparing different taxa, it was found that the birds, involved in the lowest monitoring cost, was the taxonomic group that performed the best as a biological indicator (Gardner *et al.* 2008). The knowledge of the biology of sub-Antarctic birds is critical for the development of conservation strategies for the birds and for their habitats. Furthermore, the communication to society of its most notable features will enhance the relationship of the human inhabitants with the birds and their habitats. The validity and duration of the long-term banding program, and more recently, the tracking of the reproductive biology using nest boxes in the Omora Park, ensures continuity in the study of these fundamental aspects of the ecology of the avifauna of the southernmost forests of the planet.

Looking into the future there are infinite possibilities and needs to further explore the "uniqueness" of sub-Antarctic avifauna. Thus, the ongoing studies on the Magellanic Woodpecker (*Campephilus magellanicus*), the most charismatic species in the forest of the CHBR (Arango *et al.* 2007), promise to continue revealing singularities of fundamental importance to help us understand, appreciate, enjoy, and conserve the sub-Antarctic avifauna.

REFERENCES

ARANGO, X., R. ROZZI, F. MASSARDO, C.B. ANDERSON & T. IBARRA. 2007. Descubrimiento e implementación del pájaro carpintero gigante (*Campephilus magellanicus*) como especie carismática: una aproximación biocultural para la conservación en la Reserva de Biosfera Cabo de Hornos. *Magallania* 35: 71-88.

BOTH, C. 2010. Flexibility of timing of avian migration to climate change masked by environmental constraints en route. *Current Biology* 20: 243-248.

BROWN, C.E., C.B. ANDERSON, S. IPPI, M.F. SHERRIFFS & R. ROZZI. 2007. The autecology of the Fio-fio (*Elaenia albiceps*). *Anales del Instituto de la Patagonia* 35: 29-40.

DEL HOYO, J., A. ELLIOTT & J. SARGATAL. 1999. *Handbook of the Birds of the World*. Volume 5. Barn-Owls to Hummingbirds. Lynx Edicions, Barcelona, España.

GARDNER, T.A., J. BARLOW, I.S. ARAUJO, T.C. AVILA-PIRES, A.B. BONALDO, J.E. COSTA, M.C. ESPOSITO, L.V. FERREIRA, J. HAWES, M.I. HERNANDEZ, M.S. HOOGMOED, R.N. LEITE, N.F. LO-MAN-HUNG, J.R. MALCOLM, M.B. MARTINS, L.A. MESTRE, R. MIRANDA-SANTOS, W.L. OVERAL, L. PARRY, S.L. PETERS, M.A. RIBEIRO-JUNIOR, M.N. DA SILVA, C. DA SILVA MOTTA & C.A. PERES. 2008. The cost-effectiveness of biodiversity surveys in tropical forests. *Ecology Letters* 11: 139-150.

HILLEBRAND, H., F. WATERMANN, R. KAREZ & U.G. BERNINGER. 2001. Differences in species richness patterns between unicellular and multicellular organisms. *Oecologia* 126: 114-124.

HUNTER, M.L. JR. & J.P. GIBBS. 2007. *Fundamentals of Conservation Biology*. Third Ed. Blackwell Publishing Ltd. Malden, Massachusetts, EE.UU.

IPPI, S. & R. ROZZI. 2004. Actividad diurna y nocturna del concón (*Strix rufipes*) en los bosques del Cabo de Hornos. *Boletín Chileno de Ornitología* 10: 9-12.

IPPI, S., C.B. ANDERSON, R. ROZZI & C.S. ELPHICK. 2009. Intra-annual variation in subantarctic forest bird communities. *Ornitología Neotropical* 20: 231-245.

JENNI, L. & M. KÉRY. 2003. Timing of autumn bird migration under climate change: advances in long-distance migrants, delays in short-distance migrants. *Proceedings of the Royal Society of London* B 270: 1467-1471.

LINDENMAYER, D.B. & J. FISCHER. 2006. *Habitat Fragmentation and Landscape Change: An Ecological and Conservation Synthesis*. Island Press, Washington, D.C.

MCGEHEE, S., ROZZI, R., S. IPPI, C. ANDERSON, R.A. VÁSQUEZ & S. WOODLAND. 2004. Late-summer presence of the Patagonian Tyrant, *Colorhamphus parvirostris* (Darwin) in Navarino Island, Cape Horn County. *Anales del Instituto de la Patagonia, Serie Ciencias Naturales* 32: 25-33.

MCGEHEE, S.M. & J.C. EITNIEAR. 2007. Diet of the Patagonian Sierra-Finch (*Phrygilus patagonicus*) on Navarino Island, Chile. *Ornitología Neotropical* 18: 1-4.

MCGEHEE, S.M. 2007. Consumption of Leñadura (*Maytenus magallanica*) seeds by three primarily insectivorous birds species. *Anales del Instituto de la Patagonia* 35: 71-73.

MERINO, S., J. MORENO, R.A. VÁSQUEZ, J. MARTÍNEZ, I. SÁNCHEZ-MONSÁLVEZ, C.F. ESTADES, S. IPPI, P. SABAT, R. ROZZI & S. MCGEHEE. 2008. Haematozoa in forest birds from southern Chile: Looking for latitudinal gradients in prevalence and parasite lineage richness. *Austral Ecology* 33: 329-340.

MORENO J., S. MERINO, R.A. VÁSQUEZ & J.J. ARMESTO. 2005. Breeding biology of the Thorn-tailed Rayadito (Furnariidae) in south-temperate rainforests of Chile. *Condor* 107: 69-77.

MORENO, J., S. MERINO, E. LOBATO, M.A. RODRÍGUEZ-GIRONÉS & R.A. VÁSQUEZ. 2007. Sexual dimorphism and parental roles in the Thorn-tailed Rayadito (Furnariidae). *Condor* 109: 312-320.

PRIMACK, R.B. 1993. *Essentials of Conservation Biology.* Sinauer Associates, Inc. Sunderland, Massachusetts, USA.

SOULE, M.E. & K.A. KOHN. 1989. *Research Priorities for Conservation Biology*. Island Press. Washington D.C., EE.UU.

WIENS, J.A. 2007. Does conservation need landscape ecology? A perspective from both sides of the divide. Pp. 479-493 *in Managing and Designing Landscapes for Conservation: Moving from Perspectives to Principles*, D.B. Lindenmayer & R.J. Hobbs (eds.). Blackwell Publishing Ltd. Malden, Massachusetts, EE.UU.

IEB CHILE

INSTITUTO DE
ECOLOGÍA Y
BIODIVERSIDAD

The Center for
Environmental Philosophy

Book design and editing: Francisca Massardo.

Computer Layout: Alejandra Calcutta and Stephanie Noell.

Cover Design: Alejandra Calcutta.

Cover images: Jaime E. Jiménez (Fire-eyed Diucon, Austral Pygmy-Owl, Tufted Tit-Tyrant), Jordi Plana (Magellanic Woodpecker), Steff van Dongen (measuring a Patagonian Sierra-Finch), World satellite image prepared by Maria Rosa Gallardo at the GIS Laboratory, CERE-Universidad de Magallanes, based on “The MODIS Rapid Response System.”

Full citation of the book: Rozzi R. & J. E. Jiménez. (Eds). 2014. *Magellanic Sub-Antarctic Ornithology. First Decade of Long-Term Bird Studies at the Omora Ethnobotanical Park, Cape Horn Biosphere Reserve, Chile*. University of North Texas Press - Universidad de Magallanes.

SALVIAT IMPRESORES S.A.
Seminario 739, Santiago, 56(2) 23418410 esalviat@salviatimpresores.cl
Printed in Santiago - Chile