

Unusual ground level tree cavity nesting in the Thorn-tailed Rayadito (*Aphrastura spinicauda*)

ANIDACION INUSUAL DEL RAYADITO (*APHRASTURA SPINICAUDA*) EN CAVIDADES DE ARBOLES A NIVEL DEL SUELO.

Steven M. McGehee¹, Jack C. Eitniewar², & Barry W. Glickman³

¹Department of Biology, University of Victoria, PO Box 3020, Victoria, B.C. Canada V8W 3N5
E-mail: smcgehee@uvic.ca

²Center for the Study of Tropical Birds, Inc. 218 Conway Drive, San Antonio, TX 78209-1716 USA
E-mail: jce@cstbinc.org

³Department of Biology, University of Victoria, PO Box 3020, Victoria, B.C. Canada V8W 3N5
E-mail: darwin@uvic.ca

Abstract

The Thorn-tailed Rayadito (*Aphrastura spinicauda*) is a Furnariid inhabiting the forests of Southern Chile and Argentina. Published nesting records are of nests in tree cavities, rock walls, nest boxes and buildings, all above the ground. There are no published accounts of ground level tree cavity nests. On Navarino Island, Chile, three ground level tree cavities were used by *A. spinicauda* as nest sites. Explanations for this unusual nest placement could be the lack of ground dwelling predators on the island or possible nest site limitations.

Keywords: Chile, Furnariidae, Isla de Navarino, nest site.

Resumen

El Rayadito (*Aphrastura spinicauda*) es un furnárido que habita los bosques del sur de Chile y Argentina. Los registros publicados sobre la anidación de esta especie son en cavidades de árboles, paredes rocosas, nidos artificiales en forma de caja, y edificios. Todos los anteriores sobre el suelo. No hay registros publicados sobre esta especie anidando en cavidades de árboles a nivel del suelo. En la isla de Navarino, en Chile, tres cavidades a nivel del suelo en árboles fueron utilizadas como lugares de anidación por el Rayadito. Una explicación para este tipo inusual de anidación podría ser la falta de predadores terrestres o también debido a la falta de otros lugares de anidación.

Palabras clave: Chile, Furnariidae, Isla de Navarino, sitio de anidación.

Introduction

The Thorn-tailed Rayadito (*Aphrastura spinicauda*) ranges from Coquimbo, Chile and Neuquén, Argentina to the Cape Horn Islands (Araya *et al.* 1996, Couve & Vidal 2003, Fjeldsá & Krabbe 1990, Rozzi *et al.* 2003, Venegas 1991). Thorn-tailed Rayadito inhabit the edge and interior of old growth *Nothofagus* forests and nearby second growth forests (Anderson & Rozzi 2000, Cornelius 2008, Ippi & Trejo 2003, Rozzi *et al.* 2003, Vuilleumier 1967). They have also been reported on treeless islands with bunch-grass (*Poa* sp.) and bushes (*Berberis* sp.) (Olrog 1950, Schlatter & Riveros 1997). The related Masafuera Rayadito (*Aphrastura masafuerae*) is found on Alexander Selkirk Island and

nests in natural holes in steep rock walls (Hahn *et al.* 2004).

Thorn-tailed Rayadito have been documented to nest in secondary tree cavities (Bullock 1930, Cornelius 2008, de la Peña 1987, Humphrey *et al.* 1970, Johnson 1967, Narosky *et al.* 1983, Philippi *et al.* 1954), in natural rock walls (Barros 1960) and in artificial nest boxes (Cornelius 2008, Moreno *et al.* 2005, Tomasevic & Estades 2006, Veraga 2007, Veraga & Marquet 2007). Rayaditos also nest in rafters and walls of buildings and bridges (Couve & Vidal 1999, de la Peña 1987, Estades 1999, Housse 1945, Johnson 1967, Narosky *et al.* 1983) and in holes on roadside banks (R. Schlatter pers. com.). Some Thorn-tailed Rayadito nests have been found in

unusual locations. For example, Pässler (1906, cited in Hellmayr, 1932) reported that *A. spinicauda* frequently nested in thickets where dead leaves accumulated. On Diego Ramírez Islands they have been documented to nest in tussock grasses (Schlatter & Riveros 1997). Recent research has revealed that in some habitats, especially in second growth forests, Thorn-tailed Rayadito densities are limited by suitable nest site availability and they will readily utilize nest boxes (Cornelius *et al.* 2008, Tomasevic & Estates 2006).

This note documents three ground level tree cavity nests of this species. Observations were made on Navarino Island, Chile (54°57'S, 67°39'W). Navarino Island is part of the Cape Horn Biosphere Reserve and is located south of the Beagle Channel. The Thorn-tailed Rayadito is one of 34 species of birds that inhabit the forest of the island (Ippi *et al.* 2009, Rozzi *et al.* 2003). Near the entrance to the Omora Ethnobotanical Park, a rayadito nest was discovered on 10 December 2000. The nest was 15 m from a dirt road and 60 m from the sandy beach along the Beagle Channel. This nest was located in a limb lying on the ground and contained three young chicks. Both ends of the limb were covered with soil and grass indicating that the branch had been on the ground for an extended period of time. The entrance hole measured 3 cm by 20 cm and was located 7 cm off the

ground. The actual nest structure was situated 7 cm inside, and 4 cm below, the entrance and was cup shaped. Examination showed it was constructed of Magellanic coigüe (*Nothofagus betuloides*) leaves, tiny twigs and rootlets. On 17 December the chicks were still being fed in the nest, however, on 20 December the nest was empty. While there were no obvious signs of predation, it is not known if the chicks successfully fledged. Subsequent visits to the nest from 2001 to 2006 indicated that it was not reused and it eventually filled with ground litter.

A second *A. spinicauda* ground level tree cavity nest was discovered on 20 November 2004 in Omora Ethnobotanical Park, in a 10 m tall live Nirre (*Nothofagus antartica*). The nest was located in a ground level hole in the trunk (Fig. 1). The nest itself was 3.0 cm below ground level. This nest was in a second growth forest with a livestock-grazed open under story. The nest entrance was too small to fully see into (2.6 x 8.0 cm) but it clearly contained at least four chicks. On 12 December the nest was empty and it was not known if the chicks fledged. On 05 November 2005 the nest site was checked again and found to have a single egg. On 21 November the nest contained five eggs but on subsequent checks the eggs were cold and there was no sign of adults.



Figure 1. Thorn-tailed Rayadito nesting location. Arrow points to entrance of nest at the base of the tree (Photo: S. McGehee).

A third ground level tree cavity nest was located on 25 November 2004 near the Guerrico River on the north

side of Navarino Island. The nest was at the base of a 7.6 m tall partially dead Lenga (*Nothofagus pumilio*) at the

edge of a forest overlooking a cleared slope that descended to the Beagle Channel. This nest also had an entrance too small for a detailed inspection (2.9 x 23.0 cm) but at least one chick could be seen. In late January the nest was empty and it was not known if the nest was successful but it was not reused in 2005.

In contrast to the three ground level tree cavity nests, 71 *A. spinicauda* nesting attempts in 66 above ground tree cavities were found on Navarino Island between December 2000 and January 2006 and 46 cavities were measured. The 49 cavities averaged 2.87 ± 1.91 (SD) m off the ground. The data were normally distributed (One-sample Kolmogorov-Smirnov test $z = 0.789$, $P > 0.562$, $n = 49$, Fig. 2).

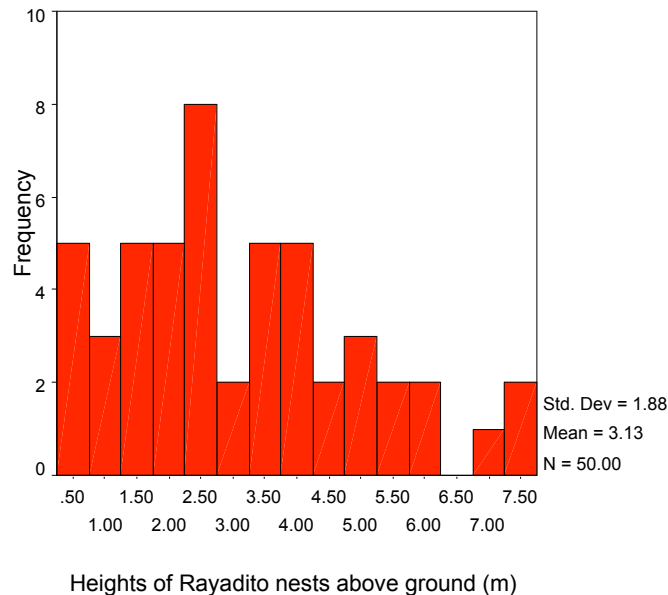


Figure 2. Histogram of heights of 49 Thorn-tailed Rayadito nest cavity entrances found on Navarino Island Chile, between December 2000 and January 2006.

One explanation for these ground level nests may be the historic lack of ground dwelling predators on Navarino Island (Anderson *et al.* 2006). Possible avian predators include thirteen species of raptors and the Austral Blackbird (*Curaeus curaesus*) (Escobar & Vukasovic 2003, Figueroa *et al.* 2004, McGehee *et al.* 2003). A Chilean Hawk (*Accipiter chilensis*) was observed eating a freshly killed *A. spinicauda* approximately 160 m from the first ground nest on 18 January 2000 (McGehee pers. obs.). Navarino Island lacks snakes, wild cats, foxes and marsupials. The only native mammals on the island are the Olive grass mouse (*Abrothrix xanthorhinus*), Long-tailed pygmy rice rat (*Oligoryzomys longicaudatus*), Chilean myotis (*Myotis chiloensis*), Small big-eared brown bat (*Histiotus montanus*) (Koopman 1967, Mann 1978), and Guanaco (*Lama guanicoe*) (Anderson *et al.* 2006). However, since the arrival of European settlers, several mammals have been introduced including Beaver (*Castor canadensis*),

Muskrat (*Ondatra zibethicus*), Mink (*Mustela vison*), feral pig (*Sus domestica*), feral horse (*Equus ferus caballus*), mouse (*Mus musculus*), Norway rat (*Rattus norvegicus*), feral cow (*Bos taurus*), feral dog (*Canis lupus familiaris*), and feral cat (*Felis catus*) (Anderson *et al.* 2006). The arrival of these new predators could reduce the nesting success of ground-nesting *A. spinicauda*, and may have already reduced the number of ground-nesters on this island (Ibarra *et al.* 2009, Schüttler *et al.* 2009). In particular, cats and Mink would likely be threats to *A. spinicauda*, either by reaching the birds within the nest or catching them as they enter or leave the cavity (Ibarra *et al.* 2009).

Another explanation for these ground level cavity nests is the possibility that there was a limitation of high quality nest cavities and therefore less desirable, potentially risky sites were selected. In a recent study of *A. spinicauda* nesting on Chiloe Island, Chile, Cornelius

(2008) found 2 nests out of a total of 70 to be located less than one meter from the ground. These two nests were in forest fragments where there were fewer predators but also fewer cavities than in old growth forests. That study also found rayaditos would increase breeding density in second growth forests by using newly placed nest boxes, indicating that nest site limitation had been occurring. The three ground level nests in our study were in a second growth forest where there were fewer ideal cavities. Plasticity in nest site selection of secondary cavity nesters is common (Aitken & Martin 2008) and has been found to occur in *A. spinicauda* (Cornelius 2008). Whether the construction of nests in ground level cavities on Navarino Island is the result of a lasting response to the historical lack of ground predators, or is due to nest site limitations or other factors can only be determined with continued research.

Literature cited

- Aitken, K. E. H. & K. Martin. 2008. Resource selection plasticity and community responses to experimental reduction of a critical resource. *Ecology* 89: 971-980.
- Anderson, C. B. & R. Rozzi. 2000. Avian communities in the southernmost forests of the world: Methodological variations for determining species composition. *Anales del Instituto de la Patagonia, Chile* 28: 89-100.
- Anderson, C. B., Rozzi, R., Torres-Mura, J. C., McGehee, S. M., Sherriffs, M. E., Schüttler, E. & A. D. Rosemond. 2006. Exotic vertebrate fauna of Cape Horn County, Chile. *Biodiversity and Conservation* 15: 3295-3313.
- Araya, B., Millie, G. & M. Bernal. 1996. Guía de campo de las aves de Chile. 7th edición, Editorial Universitaria, Santiago, Chile.
- Barros V. R. 1960. Dos aves curiosas de Chile. *Revista Universitaria* 44-45: 165-173.
- Bullock, D. S. 1930. Birds observed in the neighbourhood of Angol (Chile). *The Oologist's Record* 10: 40-46.
- Cornelius, C. 2008. Spatial variation in nest-site selection by a secondary cavity-nesting bird in a human-altered landscape. *Condor* 110: 615-626.
- Cornelius, C., Cockle, K., Politi, N., Berkunsky, I., Sandoval, L., Ojeda, V., Rivera, L., Hunter Jr., M. & K. Martin. 2008. Cavity-nesting birds in neotropical forests: cavities as a potentially limiting resource. *Ornitología Neotropical* 19 (Suppl.): 253-268.
- Couve, E. & C. Vidal. 2003. Birds of Patagonia, Tierra del Fuego & Antarctic Peninsula. the Falkland Islands & South Georgia. Fantástico Sur Birding Ltda., Punta Arenas. Chile.
- de la Peña, M. R. 1987. Nidos y huevos de aves Argentinas. Edición del autor, Santa Fé, Argentina.

Acknowledgments

We would like to thank C. Anderson, S. Ippi, C. Cornelius, R. Schlatter and J. C. Torres-Mura for sharing their unpublished data with us. Thanks to D. Allan, C. Anderson, J. Cragg, B. Ploger, P. Tymchuck and S. Woodland for reviews of earlier drafts of this paper. Kristina Cockle's suggestions greatly improved the manuscript. We are grateful to the University of Victoria, Department of Biology for office space used in the preparation of this manuscript. Special thanks to R. Rozzi and F. Massardo for establishing Omora Ethnobotanical Park and assisting with research. Support for this research came from the Omora Foundation, the Millennium Project, IEB, University of Chile and private donors.

- Escobar, M. A. H. & M. A. Vukasovic. 2003. Depredación de *Philodryas chamissonis* (Serpentes: Colubridae) sobre polluelos de *Aphrastura [Aphrastura] spinicauda* (Passeriformes: Furnariidae): una culebra arborícola? Noticiario Mensual Museo Nacional de Historia Natural (Santiago). 352: 18-20.
- Estades, C. F. 1999. Nidificación de aves en un rodal maduro de *Pinus radiata*. Boletín Chileno de Ornitología 6: 35-38.
- Figuerola, R., Orellana, R. A., Corales, S.A. & I. Shehadeh. 2004. Prey of breeding Chilean Hawks (*Accipiter chilensis*) in an Andean *Nothofagus* forest in northern Patagonia. Wilson Bulletin 116: 347-351.
- Fjeldså, J. & N. Krabbe. 1990. Birds of the high Andes. Zoological Museum, University of Copenhagen, Apollo Books, Svendborg, Denmark.
- Hahn, I., Römer, U. & R. Schlatter. 2004. Nest sites and breeding ecology of the Masafuera Rayadito (*Aphrastura masafuerae*) on Alejandro Selkirk Island, Chile. Journal für Ornithologie 145: 93-97.
- Hellmayr, C. E. 1932. The birds of Chile. Field Museum of Natural History, Zoological Series 19: 1-472.
- Housse, R. E. 1945. Las aves de Chile en su clasificación moderna. Ediciones de la Universidad de Chile, Santiago, Chile.
- Humphery, P. S., Bridges, P., Reynolds, P. W. & R. T. Peterson. 1970. Birds of Isla Grande (Tierra del Fuego). Preliminary Smithsonian Manual. University of Kansas Museum of Natural History, Lawrence, Kansas.
- Ibarra, J. T., Fasola, L., Macdonald, D. W., Rozzi, R. & C. Bonacic. 2009. Invasive American mink *Mustela vison* in wetlands of the Cape Horn Biosphere Reserve, southern Chile: what are they eating? Oryx 43: 87-90.
- Ippi, S. & A. Trejo. 2003. Dinámica y estructura de bandadas mixtas de aves en un bosque de lenga (*Nothofagus pumilio*) del noroeste de la Patagonia Argentina. Ornithología Neotropical 14: 353-362.
- Ippi, S., Anderson, C. B., Rozzi, R. & C. S. Elphick. 2009. Annual variation of abundance and composition in forest bird assemblages on Navarino Island, Cape Horn Biosphere Reserve, Chile. Ornithología Neotropical 20: 231-245.
- Johnson, A. W. 1967. The birds of Chile and adjacent regions of Argentina, Bolivia and Peru. Vol II. Platt Establecimientos Gráficos, Buenos Aires, Argentina.
- Koopman, K. F. 1967. The southernmost bats. Journal of Mammalogy 48: 487-488.
- Mann F., G. 1978. Los pequeños mamíferos de Chile. Gayana Zoología. 40: 1-342.
- McGehee, S. M., Anderson, C., Woodland, S. W., Rozzi, R. & M. Van de Maele. 2003. Listado de aves del Parque Etnobotánico Omora. 2nd edition. Parque Etnobotánico Omora, Puerto Williams, Chile.
- Moreno, J., Merino, S., Vásquez, R. A. & J. J. Armesto. 2005. Breeding biology of the Thorn-tailed Rayadito (*Furnariidae*) in south-temperate rainforests of Chile. Condor 107: 69-77.
- Narosky, S., Fraga, R. & M. De la Peña. 1983. Nidificación de las aves Argentinas (*Dendrocolaptidae* y *Furnariidae*). Asociación Ornitológica del Plata, Buenos Aires, Argentina.
- Olrog, C. C. 1950. Notas sobre mamíferos y aves del Archipiélago de Cabo de Hornos. Acta Zoologica Lilloana 5: 437-531.

- Philippi B., R. A., Johnson, A. W., Goodall, J. D. & F. Behn. 1954. Notas sobre aves de Magallanes y Tierra del Fuego. Boletín Museo Nacional de Historia Natural Santiago 26: 1-55.
- Rozzi, R., Massardo, F., Anderson, C., McGehee, S., Clark, G., Ramilo, E., Calderón, U., Calderón, C., Aillapan, L. & C. Zárraga. 2003. Guía multi-étnica de aves de los bosques templados de Sudamérica austral. Editorial Fantástico Sur, Punta Arenas, Chile.
- Schlatter, R. P. & G. M. Riveros. 1997. Historia natural del archipiélago Diego Ramírez, Chile. Serie Científica INACH (Chile) 47: 87-112.
- Schüttler, E., Klenke, R., McGehee, S., Rozzi, R. & K. Jax. 2009. Vulnerability profile of ground-nesting waterfowl following introduction of American mink on Navarino Island, Cape Horn Biosphere Reserve, Chile. Biological Conservation 142: 1450-1460.
- Tomasevic, J. A., & C. F. Estades. 2006. Stand attributes and the abundance of secondary cavity-nesting birds in southern beech (*Nothofagus*) forests in south-central Chile. Ornitología Neotropical 17: 1–14
- Venegas, C. 1991. Ensamblajes avifaunísticos estivales del archipiélago Cabo de Hornos. Anales del Instituto de la Patagonia, Chile 20: 69-82.
- Vergara, P. M. 2007. Effects of nest box size on the nesting and re-nesting pattern of *Aphrastura spinicauda* and *Troglodytes aedon*. Ecología Austral 17: 133-141.
- Vergara, P. M. & P. A. Marquet. 2007. On the seasonal effect of landscape structure on a bird species: the Thorn-tailed Rayadito in a relict forest in northern Chile. Landscape Ecology 22: 1059–1071.
- Vuilleumier, F. 1967. Mixed species flocks in Patagonian forests, with remarks on interspecies flock formation. Condor 69: 400-404.