Letters

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Tree-cavity Nesting of Austral Pygmy-Owls (*Glaucidium nana*) in Andean Temperate Forests of Southern Chile

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Tree cavities are key habitat components that structure the diversity of cavity-nesting communities (Martin and Eadie 1999). Most cavity users cannot create their own cavities (i.e., secondary cavity nesters [SCN]). Therefore, their populations can be limited by the production and availability of both excavated and natural cavities (Aitken and Martin 2008, Newton 1998).

Knowledge about the breeding biology of most neotropical cavity-nesting *Glaucidium* species varies from ''unknown'' to ''poorly known'' (Deville and Ingels 2012). The Austral Pygmy-Owl (*Glaucidium nana*), the southernmost *Glaucidium* species, is widely distributed in Chile, inhabiting forests, forest-steppe ecotones, shrublands, and sometimes urban parks (Jiménez and Jaksic 1989, Figueroa et al. 2013). Ibarra et al. (2012) suggested that in Andean temperate forests the Austral Pygmy-Owl selects stands with large living trees, which provide thermally suitable roosting and breeding sites. However, breeding records of this owl are mostly anecdotal (Housse 1945, Barros 1950, Goodall et al. 1957), with limited breeding ecology described for individuals using nest boxes (Santillán et al. 2010). Here we provide information on Austral Pygmy-Owl breeding activity and descriptions of nesting sites used in natural forest stands.

During the 2011–2012 and 2012–2013 breeding seasons we searched for nests at 15 sites (each with an area of at least 20 ha) in Andean temperate forests of the Araucanía Region, Chile (see Ibarra et al. 2012, for a full description of the study area). We spent about 6 hr daily, 5 d/wk, from October to January looking for nests of avian cavity-nesting species (n = 28 species, T.A. Altamirano, and J.T. Ibarra unpubl. data). We specifically searched for Pygmy-Owl nests by watching for cavities and breeding behavior (carrying nesting material or prey in the bill). Searching was conducted during daylight, as Austral Pygmy-Owls are known to be diurnal (Norambuena and Muñoz-Pedreros 2012).

We monitored nests we found every 4–7 d using a video camera cavity-monitoring system, until fate was determined. Furthermore, a total of 10 camera traps (Reconyx RC55, RECONYX Inc., Holmen, Wisconsin, U.S.A.) were deployed in front of active nests of Austral Pygmy-Owls and other cavity-nesting species for monitoring interspecific interactions, breeding activity, and nest fate. After the nesting season, we quantified site characteristics at three levels: (a) *cavity-level*: origin (excavated or naturally formed by tree decay processes), height, entrance orientation, cavity entrance width and height, vertical and horizontal depth; (b) *tree-level*: tree species, diameter at breast height (DBH), diameter at cavity height (DCH), vine and epiphyte cover, decay stage of nest tree (decay classes: 1: live, healthy tree; 2a: live tree with sign of boring arthropods and/or fungal decay; 2b: nearly dead tree with broken top and advanced levels of decay, with <20% live branches; 3: standing dead tree in progressive states of decay; adapted from Thomas et al. 1979); (c) *habitat-level*: forest successional stage within 50-m radius (early = 4-20 yr old, mid = 35–70 yr old, late = >100 yr old), slope, canopy cover, understory cover, tree density (only trees with DBH >12.5 cm were counted), signs of recent human activity (logging, grazing, or fire).

We found three Austral Pygmy-Owl nests (one in 2011–2012 and two in 2012–2013) in tree cavities (Table 1). Pygmy-owls started laying during October (nests #1 and #3) and November (nest #2). As in nest boxes (mean clutch = 4.8 eggs, Santillán et al. 2010), clutch size in tree cavities ranged from four to five eggs. Camera trap records for nest #3 indicated that eggs were incubated by one adult, likely the female (Housse 1945), but we often recorded a second adult calling from the surrounding area while we monitored the nest. The incubation period of 15–17 d was only recorded for nest #1. All nesting attempts were successful, resulting in three fledglings for nests #1 and #2, and three or more for nest #3. Fledging occurred between 21–22 December (nest#1), 19–20 December (nest #2), and 30 December–01 January (nest #3).

Nests #1 and #2 were located in the same natural cavity generated by decay where a branch had fallen from the tree trunk. The hole was used in consecutive seasons confirming that this owl species will reuse cavities in subsequent years (Housse 1945), although we do not know whether the same adults nested in both years, because adults were unmarked. The nest tree was located in a suburban early successional forest dominated by coihue (*Nothofagus dombeyi*) and lingue (*Persea lingue*), where numerous large trees and snags remained. Nest #3 (Fig. 1a) was located in a cavity apparently excavated by a Chilean