

## OBSERVATIONS OF AGGRESSIVENESS AND TERRITORIALITY AMONG SPECIES OF RHINOCRYPTIDAE IN A RAIN FOREST FRAGMENT IN SOUTHERN CHILE

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**Observaciones de agresividad y territorialidad entre especies de Rhinocryptidae en un fragmento de bosque templado húmedo del sur de Chile.**

**Key words:** Aggressiveness inter-species, Rhinocryptidae, Chiloé rain forest, Chile.

All five species of birds in the Family Rhinocryptidae inhabiting the temperate forests of austral South America are endemic to these temperate forests (Johnson 1967, Meyer de Schauensee 1982, Arctander & Fjeldså 1994). Three of them, the Chucao Tapaculo (*Scelorchilus rubecula*), the Huet-huet (*Pteroptochos tarnii*) and the Andean Tapaculo (*Scytalopus magellanicus*) are sympatric inhabitants of the temperate rain forest of Chiloé Island (Short 1969, Correa & Figueroa in press). Throughout their entire latitudinal distribution range, these rhinocryptids live in primary and secondary forests, and show preference for forest understories (Johnson 1967). However, lowland forests in southern Chile have become increasingly fragmented through felling and burning, thus decreasing available habitat for feeding and nesting of rhinocryp-

tid species (Sieving *et al.* 2000). All three rhinocryptids have omnivorous and opportunistic diets, depending on regional and seasonal changes in the availability of invertebrates and fruits (Armesto *et al.* 1987, Correa *et al.* 1990, Sabag 1993, Rozzi *et al.* 1996). The aim of this study was to register behavioral patterns, including degrees of aggressiveness, in Chucaos Tapaculos, Huet-huets, and Andean Tapaculos during their breeding period in a forest fragment located on the north-eastern part of Chiloé Island. This study constitutes the first report of aggressive behavior among rhinocryptids inhabiting the rainforests of southern Chile.

The study was conducted between 20 October and 20 November 1994 in a forested area near Manao, c. 50 km east of Ancud (41°S, 73°W), on the northern coast of Chiloé Island. Observations were carried out within a primary forest fragment (Mandiola forest) c. 15 ha in size that had been intervened for wood extraction. The forest canopy was dom-

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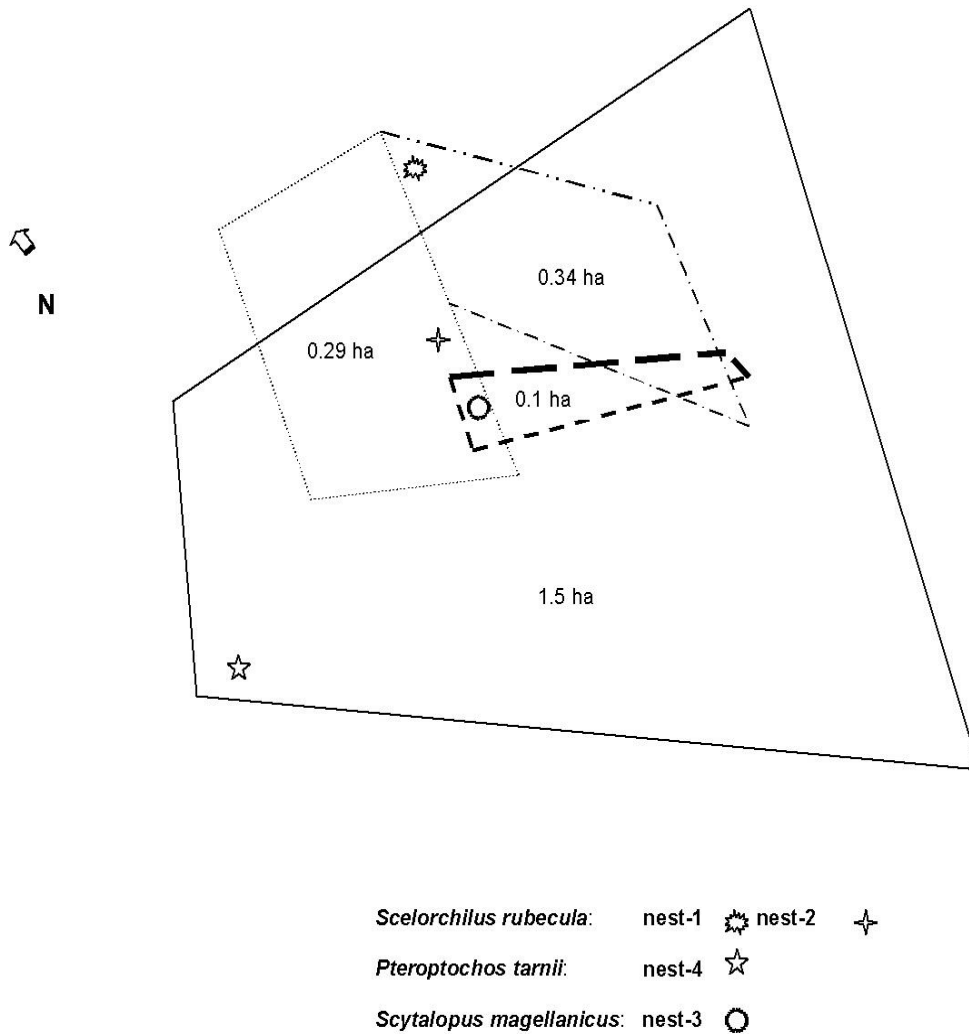


FIG. 1. Areas occupied by the rhinocryptid species in a forest fragment of Chiloé Island.

inated by various tree species including *Nothofagus nitida*, *Drymis winteri*, as well as a few Myrtaceae such as *Amomyrtus luma*, *A. meli* and *Myrcogenia planipes*. Numerous species of vines grow within the forest interior (e.g., *Luzuriaga radicans*, *Philesia magellanica*) as well as epiphytes (Gesneriaceae: *Mitraria coccinea* and *Sarmienta scadens*), lichens (e.g., *Usnea* sp.), ferns (*Hymenophyllum*) and a variety of differ-

ent mosses. We observed activity and movement patterns of two pairs of Chucao Tapaculos for a period of 17 days (Correa 1999). A pair and a female were captured and banded with color rings. They were observed daily, every two hours between the 06:00 h and 18:00 h. Moreover, we recorded the daily activity of pair of Huet-huets every four hours between 06:00 h and 18:00 h during a

30-day period. Finally, we registered the activity of a pair of Andean Tapaculos every two hours between 06:00 and 18:00 h during 17 days. We defined the approximate limits of breeding territories within each species by joining various observation points (*sensu* M. Willson pers. com.). Observation points were defined following the birds leaving their nests in search for food and back again, or until they were lost from view. We estimated the size of the areas used in the search for food, or nest materials, and recorded inter-species aggressive interactions. By means of a single "sudden attack" (Lorenz 1978) using fog nets placed at ground level, we captured both individuals of a pair of Chucao Tapaculos that had two nestlings in their nest. We also captured the female of a second pair with three chicks in its nest. All captured birds were color-banded.

The first pair of Chucao Tapaculos (nest-1, Fig.1) used c. 0.34 ha of forest during the study period. Its nest was meticulously constructed in a *Myrcogenia ovata* tree close to the edge of the forest fragment, c. 1.5 m above ground level. It consisted of dry leaves, branches, lichens, and mosses. The second pair (nest-2) used c. 0.29 ha of forest during of the period of study. The dense nest was constructed over branches of *Chusquea quila*, and was made of dry leaves, mosses, lichens and materials of the same *C. quila*, c. 2 m above ground level. Both nests were separated by a distance of c. 50 m (Fig. 1). The Huet-huet pair had two nestlings in a hole within a dead *Nothofagus dombeyi* tree, c. 4 m above the ground. The Huet-huet pair observation points were defined following the birds leaving their nests in search for food and back again, or until they were lost from view. The pair used an area of c. 1.5 ha. Its nest was c. 140 m away from those of the two Chucao Tapaculo pairs (Fig. 1). The nest of the Andean Tapaculo pair was located under a *C. quila* shrub, c. 10 m from that of the sec-

ond pair of Chucao Tapaculos. The Andean Tapaculo pair occupied an area of c. 0.1 ha of forest, overlapping the area occupied by the two other species (Fig. 1).

All three rhinocryptid species used the same habitat of forest every day, going out of the estimated limits of their territory only on rare occasions. The forest habitats used by the four pairs were highly heterogeneous, consisting of small and shallow streams with abundant vegetation cover in various stages of decomposition and large dead trees. The three species of Chilean rhinocryptids seem to display the same behavioral patterns. When one of the two individuals of a given pair was away searching for food (between 10 and 30 min), its place at the nest was taken by its respective mate. Also, nests were cleaned and maintained regularly and each pair generally followed the same route on the ground while searching for prey for themselves or their nestlings. The small streams were regularly visited during the entire day, each time the individuals left the nest.

We registered different degrees of aggressiveness between species and pairs. No sign of aggressiveness was observed between the two Chucao Tapaculos; one of the pairs only rarely entered the territory of the other. In contrast, we observed inter-species aggressive behavior. The most aggressive species proved to be the largest sized Huet-huet (c. 154 g and 25 cm). An adult Huet-huet traveling with two of its nestlings and mate was seen attacking an adult Chucao Tapaculo (c. 38 g and 17 cm) of nest-2, violently entering the nest and assaulting it, but without causing physical damage to the chicks. Furthermore, the same pair of Chucao Tapaculos (nest-2) was aggressive towards one of the adult Andean Tapaculos (c. 10 g and 10 cm) of nest-3 when the latter was searching for food in the vicinity of nest-2. However, overall, only a small number of aggressive encounters were detected among rhinocryptid species in this

study. These observations suggest that the degree of aggressiveness among Chilean rhinocryptids increases with territory size and body size.

We suggest that the aggressive behavior of the Huet-huet towards the Chucao Tapaculo is associated with the defense of its nestlings and not with an attempt of the Huet-huet to attack the nest of the Chucao Tapaculo. Nest predation among rhinocryptids has not been registered in Southern Chile. Additionally, the aggression of the Chucao Tapaculo could be related to the fact that an Andean Tapaculo was approaching the nest where the Chucao Tapaculo was brooding its nestlings. This study constitutes the first report showing that the three rhinocryptids breed simultaneously. We suggest that the decrease in habitat availability due to increasing temperate rainforest fragmentation in southern Chile will result in a reduction in the distance among nests, which in turn could result in an increase in the degree of aggressive behavior due to a reduced habitat availability for territories and reduce availability of resources. Finally, the results suggest that the Huet-huet has the adequate traits (aggressiveness and size) that enable it to displace the Chucao Tapaculo and the Andean Tapaculo in forest fragments similar in size to the one studied. However, a significant reduction in the size of the fragment could force the migration of the Huet-huet because it needs a larger forested area.

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