

## DISTRIBUTION AND HABITAT PREFERENCES OF THE SOUTHERN ANTPIPIT (*CORYTHOPIS DELALANDI*) IN THE AUSTRAL YUNGAS OF BOLIVIA AND ARGENTINA

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**Distribución y preferencias de hábitat del Mosquitero (*Corythopsis delalandi*) en las yungas Australes de Bolivia y Argentina.**

**Key words:** Argentina, Bolivia, *Corythopsis delalandi*, habitat preference, premontane forest, Southern Antpipit, yungas forest.

### INTRODUCTION

The currently known distribution of the Southern Antpipit (*Corythopsis delalandi*) ranges from southern Brazil to eastern Paraguay, northeastern Argentina and east of Bolivia (Ridgely & Tudor 1994, Fitzpatrick 2004). According to the most recent review of the Tyrannidae family, this species is distributed towards the east of the department of Santa Cruz in Bolivia (Fitzpatrick 2004), where it has been found in gallery forests and lowland evergreen forests from 400 to 700 m (Hennessey *et al.* 2003). Although Narosky & Yzurieta (1987) considered this species as “occasional or with doubts” for northwestern Argentina in the last revised edition of their book, they excluded it from the region (Narosky & Yzurieta 2003). Mazar Barnett & Pearman (2001) do not consider the Southern Antpipit as a species characteristic of the Aus-

tral yungas, but they include it as “accidental, registered only few times or with historical records”. Other general works on Argentinean avifauna do not mention this species for northwestern Argentina. Here we report new distribution records of the Southern Antpipit for the Austral yungas in southern Bolivia and northwestern Argentina and we analyze its habitat preferences in this area.

### METHODS

We conducted observations in the Austral yungas or Selva Tucumano-Boliviana that extends as a narrow latitudinal strip between 19 y 28°S along the eastern slopes of the Bolivian and Argentinean Andes (Brown *et al.* 2001, Navarro & Maldonado 2002). Observations were conducted during numerous trips to more than 40 localities between January 2001 and September 2006. All records corre-

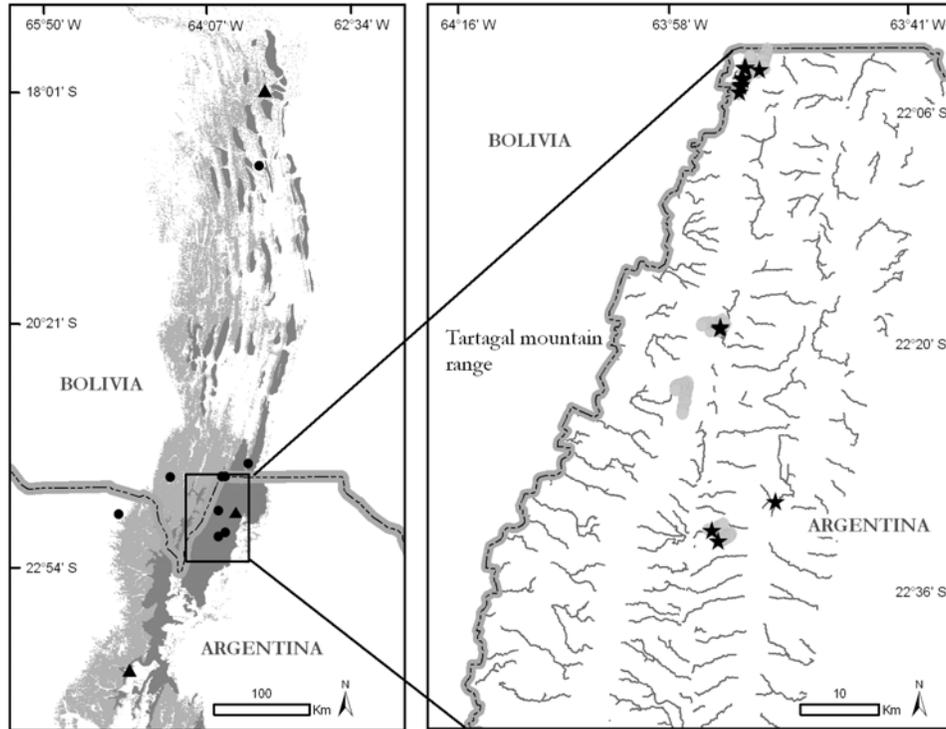


FIG. 1. Map of the Austral yungas showing the premontane forest (dark grey), the new distribution records (black dots) of the Southern Antpipit, and additional records (black triangles) by Olog (1979), Rivero *et al.* (2004), and L. Rivera (*pers. com.*). The enlarged region of the Tartagal mountain range shows the distribution of Southern Antpipits (black stars) and location of point counts (grey dots) conducted during spring; schematic distribution of medium-size creeks preferred by the species is indicated (see text).

spond to the lower altitudinal belt, the premontane forest (Fig. 1), a region characterized floristically (Cabrera 1976, Prado 2000). In Argentina, this forest is found from 300 m in the lowlands up to 700 m, reaching locally up to 1000 m (Brown *et al.* 2001, *in press*). In Bolivia, the premontane forest is found mostly from 600 to 800 m elevation, and use to be considered together with other driest forest in the chaco serrano region (Ibisch *et al.* 2003) more than in the Selva Tucumano-Boliviana. We never recorded the Southern Antpipit in higher altitudinal belts (*i.e.*, montane forests) of the Austral yungas, although

we visited several localities during the same study period.

In 2004 and 2005, we conducted a more intensive survey in the Tartagal mountain range, Salta province, Argentina, close to the Bolivian border. Within a 315,000 ha area, we selected 11 sampling sites on the condition that they covered the major forest types and the complete elevation range. Topography in the area is heterogeneous, with few flat areas at the bottom of narrow valleys and along the main rivers (Blendinger *et al.* *in press a*). The dominant vegetation is a deciduous forest with *Anadenanthera colubrina*, *Callycophyllum*

TABLE 1. Recording localities of Southern Antpipits in the Premontane Forest of Austral Yungas from Bolivia and Argentina.

Localities	Latitud	Longitud	Elevation	Date
Yumao, dep. Santa Cruz, Bolivia	19°10'S	63°35'W	715 m	Jan 2003
Caiza, dep. Tarija, Bolivia	21°53'S	63°41'W	754 m	Jan 2003
Macueta Norte, prov. Salta, Argentina	22°01'S	63°54'W	1110 m	Aug 2004, Oct 2005
Campo Largo, prov. Salta, Argentina	22°02'S	63°56'W	700 m	Oct 2005
Arroyo Aguay, prov. Salta, Argentina	22°31'S	63°54'W	679 m	Oct 2005
Finca Falcón, prov. Salta, Argentina	22°19'S	63°58'W	679 m	Nov 2004, Oct 2005
Río Seco, prov. Salta, Argentina	22°33'S	63°58'W	555 m	Nov 2005
Abra Grande, prov. Salta, Argentina	22°06'S	64°25'W	430 m	Jan 2001
Finca Alto Verde, prov. Salta, Argentina	22°21'S	64°54'W	692 m	Sep 2006

*multiflorum*, *Phyllostylon rhamnoides* and *Erytheca roseorum* as the most characteristic tree species, with an open understory and only leaf litter at ground level. In more humid sites such as less exposed slopes and in narrow gorges with creeks, the vegetation is dominated by evergreen tree species as *Cinnamomum porphyria*, *Ocotea puberula*, *Chrysophyllum gonocarpum*, *Blepharocalix salicifolius*, *Diatenopteryx sorbifolia* and *Cupania vernalis*, with a denser understory than in deciduous forests and herbaceous cover at ground level. The conservation status of the area is relatively good compared with other premontane forest areas of northwestern Argentina (Blendinger *et al.* in press b). As part of a larger study, at each of these 11 sites we conducted 30 point counts at least 200 m apart. Distance from observer was recorded for all birds with an accuracy of 10 m; nevertheless, the number of detections was insufficient for estimating Southern Antpipit density with distance methods. Thus, all detections within a 50-m radius around the observer were used for estimating density. Counts started at sunrise and finished no more than 3 h later. At each point we registered all individuals seen or heard for 10 min during a single point count. Simultaneously with point counts we recorded bird vocalizations using a unidi-

rectional Sennheiser microphone and a Marantz PMD 222 tape recorder. All sound recordings were later analyzed to corroborate field identifications and to determine the presence or absence of Southern Antpipits. For each point count, we recorded its location on the slopes, type of forest, percent of mature and secondary forest, and distance to human created edges; all points were geographically referenced and incorporated to a geographic information system. By visual interpretation of a Landsat image taken on 3 May 2005, we established the extension of Austral yungas forests in the Tartagal and Alto Río Seco mountain ranges, and we used an overlay of digital elevation model with a 40 m cell resolution to classify watersheds size, to estimate their length and to delimit a buffer area of 100 m at each side of each river. For all spatial analyses we used Arc GIS v. 9 Spatial Analyst (ESRI 2005).

## RESULTS AND DISCUSSION

We recorded Southern Antpipits in nine localities, two in Bolivia and seven in Argentina (Table 1). All observations, except two, occurred between October and January, during the spring and summer wet season, which

is the main reproductive season of most bird species in the region. Because of its cryptic behavior and shyness, most detections of the Southern Antpipit were done by sound. The lack of records during winter months may be due to migratory movements during the non-breeding season (presumably towards the Chiquitania in eastern Bolivia), or to a lower detection because of less frequent vocalization in this season.

The record in Yumao (Bolivia) corresponds to the northern distribution limit of the premontane forest of the Austral yungas; here we mist-netted four individuals. Those and at least two other individuals recorded occurred in the dense understory on the lower end of the slopes next to the dry bed of a small creek. In the northern sector of the premontane forest, the bird diversity is influenced by the dry forests located towards the north and northeast, such as Chiquitano forests where the presence of the Southern Antpipit is known. The closest published record of the species in Bolivia is in Tejerías (18°28'S, 63°31'W), 80 km north in a semi-deciduous forest with clear Chiquitano affinities (Rivero *et al.* 2004). Several other bird species frequent in lowland forest or dry forests [such as the Black-bellied Antwren (*Formicivora melanogaster*), Bolivian Slaty-Antshrike (*Thamnophilus sticturus*), Fawn-breasted Wren (*Thryothorus guarayanus*) and Flavescent Warbler (*Basileuterus flaveolus*)] were also recorded in Yumao, but were absent or only occasionally seen in southern areas of the premontane forest. Although species composition of eastern premontane forest assemblages are influenced by the chaco along most of its latitudinal range (Blendinger & Alvarez in prep., see also Fjeldså & Mayer 1996, Herzog & Kessler 2002), several lowland species seems to contact with the premontane forest only in its northern sector (e.g., Yumao), from where they could expand to the south along premontane forests.

In Caiza (Bolivia, Table 1), located in the eastern slopes of the Aguaragüe range, we registered one Southern Antpipit in evergreen degraded forest near a creek during a brief visit to this site. In Argentina, we captured and photographed an individual in the locality of Abra Grande (Table 1). This site was one of the few remnant fragments of the premontane forest in lowland areas, which largely have been transformed to agriculture lands (Blendinger *et al.* in press b). Three other individuals were tape recorded in Alto Verde (Table 1), which represented our southernmost records of the species. All of them were found in evergreen forest growing on the bottom of shallow gorges. The remaining five sites where we recorded the Southern Antpipit were located in the Tartagal mountain range, where this species was frequently observed in the understory and at ground level of mature forest and old second-growth forest, mostly close to medium-sized creeks. All individuals in this area were recorded between October and December 2004, except one that was observed on a trail along mature forest with little human intervention in August 2004 (Table 1).

*Habitat preferences and population density.* In the Tartagal mountain range, we censused six sites (180 point counts in total) during winter (from May to August) and five sites (150 counts) during spring (October and November). We recorded 11 individuals during spring in four of these sites, whereas none were recorded during winter. The estimated density for spring for the study area was  $0.09 \pm 0.33$  (mean  $\pm$  SD) individuals  $\text{ha}^{-1}$ . Most records (73%) corresponded to points located within 100 m of medium-sized creeks (i.e., located in 100 to 1000 ha watersheds). These observations, along with several occasional records during non-systematic sampling suggest that the Southern Antpipit occurs in the region mainly in the lower part of humid

gorges associated with medium-sized creeks. In this habitat, the estimated density for the Southern Antpipit was  $0.63 \pm 0.64$  individuals  $\text{ha}^{-1}$ .

The premontane forest in the study area is geographically continuous along the Tartagal and Alto Río Seco mountain ranges, extending towards the north to the border with Bolivia and to the south up to the northern margin of the Bermejo river ( $23^{\circ}45'S$ ). This region represents the largest continuous forest remnant of the premontane forest of the Austral yungas, with an area of about 430,000 ha. According to observations conducted along a 2-km point count transect during October in the locality of Campo Largo, we presume that the territories were distributed linearly along the rivers. Based on Landsat image analysis, we estimated 950 linear km of medium-sized creeks preferred by the Southern Antpipit for the surveyed area, comprised between 520 and 1100 m elevation. When considering a 100-m buffer to both sides, we estimated that the preferred habitat available for the Southern Antpipit amounts to 19,800 ha in Argentina.

Tartagal and Alto Río Seco mountain ranges represent the southern distributional limit in the Austral yungas of several other bird species, such as Military Macaw (*Ara militaris*), Lineated Woodpecker (*Dryocopus lineatus*), White-necked Thrush (*Turdus albicollis*), Purplish Jay (*Cyanocorax cyanomelas*) and Black-goggled Tanager (*Trichothraupis melanops*). These species are common north of the Bermejo river but are occasional or absent towards the south of this river. In contrast, available evidence suggests that the distribution of the Southern Antpipit is expanding towards the south along the premontane forest of the Austral yungas. The first specimen of Southern Antpipit collected for this region was a male captured in April 1979, 6 km west of Piquirenda (Olrog 1979). During several study trips to these mountain ranges during

the 1960s and 1970s, Olrog and his collaborators sampled birds using mist nets for collection and/or banding purposes. However, no additional specimens of Southern Antpipit were captured during that time period. Furthermore, the species is not included for northwestern Argentina in Olrog's bird guide (Olrog 1984). The site where Olrog collected that specimen belongs to the same mountain range (Tartagal and Alto Río Seco) where we obtained most of our records and where other researchers also recently reported observations of the Southern Antpipit (M. Pearman pers. com., Coconier in press). As birds in this mountain range are being surveyed since four decades, the number of new records supports the idea that the species is expanding to the south more than it became recorded more often as consequence of thorough researches. According to the possible expansion of the distribution range of this species towards the south, it is possible that it might be more widely distributed in northwestern Argentina. Besides our southernmost record in Abra Grande, another sighting has been reported recently for Ledesma ( $23^{\circ}46'S$ ,  $64^{\circ}48'W$ ), Department of Ledesma in the province of Jujuy, in February 2006 (L. O. Rivera pers. com.).

As previously mentioned, the scarcity of records between April and September suggests that Southern Antpipits present partial migratory behavior in the southern end of their distribution. The species is regarded as resident in most of its range. However, a migratory behavior for southernmost populations was reported during winter for many bird species in the Austral yungas (e.g., Capllonch 1997, Capllonch & Lobo 2005). Flores *et al.* (2001) consider this species as resident in the Chiquitano forest in eastern Bolivia, although it was more abundant during the wet season. The high density observed in October in Tartagal mountain range might correspond to transient individuals during

migration towards the south. However, the scarcity of records farther south does not support this prediction. Furthermore, birds were regularly spaced and responded aggressively to play back, suggesting that they might have already established nesting territories. Although the individuals we captured did not show evidence of reproductive activity such as a cloacal protrusion or brood patch, birds in breeding condition were recorded between October and December in Bolivia and north-eastern Argentina (Fitzpatrick 2004).

We provide novel distribution data for the Southern Antpipit for the Austral yungas (Departments of Santa Cruz and Tarija in Bolivia, and in Salta Province in Argentina), which suggest a recent expansion of this species range towards the south. Although Southern Antpipits seem to be tolerant to forest disturbances (Hernandes Volpato 2003), their persistence in the region might be threatened. This species has a marked habitat preference in Austral yungas, where it occupies almost exclusively the premontane forest, a seriously threatened ecosystem which undergoes a very high transformation rate.

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