Zootaxa 3873 (1): 001–024
www.mapress.com/zootaxa/
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Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3873.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:651E5898-502F-4BD7-AFD0-1EACC556A4B5

Geographic variation and phylogenetic relationships of *Myiopagis olallai* (Aves: Passeriformes; Tyrannidae), with the description of two new taxa from the Northern Andes

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Abstract

Geographic variation in vocalizations, morphology and plumage patterns in New World flycatchers is little understood, particularly in rare species with disjunct distributions. We discovered a distinct new flycatcher of the genus *Myiopagis* from cloud forests of the northern Central Andes in Antioquia, Colombia. Comparisons of vocalizations and external morphology, and molecular phylogenetic analyses, demonstrate that the "Antioquia *Myiopagis*" is a unique lineage of the *M. caniceps-olallai* group. We show that three specimens collected in 1940-1951 from cloud forests of Serranía de Perijá in Venezuela, and traditionally assigned to *M. caniceps,* represent another distinct taxon that is closer to the "Antioquia *Myiopagis*" and *M. olallai*. Both new taxa, from Antioquia and Perijá, are described as subspecies of *M. olallai*. We present a phylogenetic hypothesis for the *M. caniceps-olallai* group, in which *M. olallai* and the "Antioquia *Myiopagis*" are phylogenetically nested within the polytypic *M. caniceps*, which consists of at least four distinct lineages, indicating that species diversity in this group could be underestimated.

Key words: Andes, Colombia, cloud forest, Foothill Elaenia, Serranía de Perijá, species tree, Venezuela, vocalizations

Introduction

The suboscine passerines of the New World have long presented challenges for taxonomy and systematics because traditional morphological assessments are often misleading with regard to evolutionary relationships. Morphology, plumage patterns and coloration can vary subtly across species or be highly homoplasious in this diverse clade (e.g., Birdsley 2002; Ohlson *et al.* 2009; Hosner & Moyle 2012). The innate nature of vocalizations in nearly all suboscines (Kroodsma 1984; Kroodsma & Konishi 1991; Saranathan *et al.* 2007, Touchton *et al.* 2014) has been instrumental in redefining species limits (Isler *et al.* 1998; Remsen 2005), especially when combined with molecular phylogenetic data (Isler *et al.* 2012). The concordance between vocal and phylogenetic variation to elucidate species boundaries has demonstrated that diversity of Neotropical suboscines has been greatly underestimated in the past. Although the most striking example of this is found in the family Rhinocryptidae, in which the number of independent lineages and recognized biological species has increased fourfold in the past two decades (Krabbe & Schulenberg 2003; Cuervo *et al.* 2005; Mata *et al.* 2009; Krabbe & Cadena 2010; Maurício *et al.* 2014), numerous hitherto undetected species have been found in other suboscine lineages as well, e.g., Thamnophilidae (Chaves *et al.* 2010; Whitney *et al.* 2013), Grallariidae (Carantón-Ayala & Certuche-Cubillos 2010; Carneiro *et al.* 2012), Tityridae (Nyári 2007) and Tyrannidae (Rheindt *et al.* 2013; Zimmer *et al.* 2013). Often cryptic species are first detected by their vocalizations and then confirmed through more detailed examination of specimens and subsequent phylogenetic analyses. These discoveries were largely due to increasing

Accepted by T. Chesser: 19 Sept. 2014; published: 14 Oct. 2014

All field observations of *M. o. coopmansi* involved birds in mixed-species flocks foraging high in the tall canopy of primary cloud forests. The northern end of the Central Cordillera is a biogeographic hotspot where lineages of multiple biogeographic origins occur and endemic bird species like *Lipaugus weberi* are threatened (Cuervo *et al.* 2008a). The range of the newly discovered *M. o. coopmansi* might include the least explored adjacent areas of the northernmost Western Cordillera, which have suitable habitat for this taxon within its known elevational range (Fig. 10). In Serranía de Perijá, *M. o. incognita* is only known from the type series collected on the eastern slope in Venezuela, where a national park protects continuous tracts of cloud forest habitat. This bird has not been recorded since 1951; recent field work in the Colombian slope concentrated on elevations above the known records of this taxon (López-O. *et al.* 2014). Although it may well extend to the Colombian side of Perijá, vast deforestation along the west slope has left only very small habitat patches. The habitat is cleared below 1,600 m in most areas (López-O. *et al.* 2014). This enigmatic taxon might also occurr in Sierra de Ocaña and the Sierra Nevada de Santa Marta.

The elevational range of *M. olallai* in Ecuador and Peru is 900–1,500 m (Coopmans & Krabbe 2000; Schulenberg & Kirwan 2012), whereas *M. o. coopmansi* occurs at slightly higher elevations, from 1,300 up to 1,850 m. The three specimens of *M. o. incognita* were taken between 1,100 and 1,200 m in Perijá. All known records of *M. olallai* occur entirely above the upper elevational limit of the distantly related *M. caniceps cinerea* (<700 m; Schulenberg & Kirwan 2012), the only *caniceps* taxon with which *M. olallai* could overlap along the Amazonian slopes from Ecuador through central Peru. The sister clade of *M. olallai* ranges as close as southern Peru (*M. c.* aff. *caniceps*) in the Amazonian lowlands and foothills of Puno, but *M. olallai* has not been recorded that far south. *Myiopagis olallai* may be one example of adaptation by an Atlantic forest ancestor to novel Andean environments, and rapid plumage evolution in geographic isolation.

Acknowledgments

We thank fellow museum curators and collectors for facilitating our study: N. Rice (ANSP), M. Shanley, P. Sweet, and T. J. Trombone (AMNH), T. Valqui (CORBIDI), M. Salcedo (Pons), G. Mayr (SMF), J. McCormack and J. Maley (MLZ), G. R. Graves, B. K. Schmidt and C. M. Milensky (USNM), M. Mueller and R. Diesener (ZSM). E. Bonaccorso contributed photos and data of the *M. olallai* type series at MECN. We thank M. G. Harvey (MGH), A. Spencer, T. Brooks, N. Athanas, D. Geale, W.-P. Vellinga, S. L. Hilty, C. M. Wagner, R. Ahlman, C. Kinschots, V. Mouret, S. Sommazzi, and T. Seimola for discussion or for sharing their observations. For company and help during fieldwork we thank D. Bermúdez, N. Gutiérrez-Pinto, J. E. Avendaño, J. P. López, and J. Gutiérrez. This study would not be have been possible without the hospitality of the people of Amalfi and Anorí, and of J. Tello in New York. CORANTIOQUIA (especially J. L. Toro and J. C. Restrepo), and other national authorities have supported us in various ways over the years. Funding was provided in part by CORANTIOQUIA, IAvH, Idea Wild, Lewis and Clark Exploration Fund, Society of Systematic Biologists, Society of Integrative and Comparative Biology, F. M. Chapman Memorial Fund, American Ornithologists' Union, Wilson Ornithological Society, by NSF grants DDIG DEB-0910285 and DEB-1146423. Special thanks go to C. E. Braun and the Wilson Ornithological Society for permission to reprint copyrighted material, M. Álvarez at the Banco de Sonidos Ambientales (IAvH-BSA), and G. Budney at the Macaulay Library, Cornell Lab of Ornithology (ML) for a sound equipment loan. AMC especially thanks feedback from J. E. Avendaño, B. Whitney, D. F. Lane, and the late P. Coopmans. The manuscript benefited from comments by G. Bravo, T. Chesser, G. R. Graves, N. Krabbe, M. Robbins, and B. Whitney.

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