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Cryptic speciation in the Lesser Elaenia *Elaenia chiriquensis* (Aves: Passeriformes: Tyrannidae)

FRANK E. RHEINDT[1,4], NIELS KRABBE[2], ALISON K.S. WEE[1] & LES CHRISTIDIS[3]

[1]*Department of Biological Sciences, National University of Singapore, 14 Science Drive 4, Singapore 117543*
[2]*Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100, Copenhagen, Denmark*
[3]*National Marine Science Centre, Southern Cross University, Coffs Harbour, NSW Australia 2450*
[4]*Corresponding author. E-mail: dbsrfe@nus.edu.sg*

Abstract

Tyrant-flycatchers (Tyrannidae) are a taxonomically confusing bird group containing a large degree of cryptic diversity that has only recently begun to be unraveled through the application of acoustic and molecular methods. We investigated all three subspecies of the Lesser Elaenia, *Elaenia chiriquensis* Lawrence, across their range using sound recordings as well as nuclear and mitochondrial markers. We show that two of the three subspecies, the nominate race from southern Central America and the widespread South American subspecies *E. c. albivertex* Pelzeln, have undergone very low levels of vocal and molecular differentiation across their fragmented range. In contrast, the isolated taxon *E. c. brachyptera* Berlepsch, endemic to the western and also, as recently shown, eastern slopes of the northern Andes, is phylogenetically and vocally distinct from other Lesser Elaenias, indicating that it constitutes a separate biological species.

Key words: Neotropics, Elaeniinae, diversification, cryptic differentiation, bioacoustics, Andes, Panamá, vocalization, mitochondrial DNA, nuclear DNA, Coopman's Elaenia

Introduction

With 300–400 species in approximately 70 genera, the tyrant-flycatchers (Tyrannidae) are one of the richest bird families worldwide, but equally one of the least understood in terms of taxonomy (Fitzpatrick 2004). With generally inconspicuous plumage that often looks near-identical even across generic boundaries, many species have evaded formal recognition until recently (Fitzpatrick 2004), and additional cryptic species continue to be discovered (e.g. Coopmans & Krabbe 2000; Alonso & Whitney 2001; Johnson & Jones 2001; Zimmer *et al.* 2001; Herzog *et al.* 2008). Moreover, new insights into the importance of vocalizations for species recognition (Alström & Ranft 2003), especially in tyrannid flycatchers (Rheindt *et al*. 2008a), have revealed further tyrannid species diversity (e.g. Lanyon 1978; Reynard *et al.* 1993; Zimmer & Whittaker 2000). The rapid advancement of molecular methods in the field of phylogenetics over the past decade has also added to our knowledge of alpha taxonomy in tyrant-flycatchers (García-Moreno *et al.* 1998; Chesser 2000; Johnson & Cicero 2002; Joseph *et al.* 2003a, b; Joseph & Wilke 2004; Rheindt *et al.* 2008a, b, c; 2009a, b; 2013).

The genus *Elaenia* is a fairly homogeneous group of tyrant-flycatchers comprising 18 currently recognized species distributed mostly throughout drier and scrubbier parts of the Neotropics (Hosner 2004). The identification of *Elaenia* flycatchers requires extreme care, as some species are challenging to distinguish even in the hand; this has created widespread confusion over distributional boundaries, vocalizations and even species limits within the genus (Zimmer 1941; Traylor 1982; Ridgely & Tudor 1994; Fitzpatrick 2004; Hosner 2004).

The Lesser Elaenia *Elaenia chiriquensis* is one of the most widespread members of the genus, occurring in open country throughout much of the Neotropics (Figure 1). The three subspecies are distributed as follows: nominate *chiriquensis* in Panama and Costa Rica; *E. c. brachyptera* in the border region between Ecuador and Colombia on the west slope of the Andes in the Chocó Region; *E. c. albivertex* throughout much of tropical and subtropical lowland South America, except for Amazonia (Figure 1). Recently a cis-Andean population tentatively attributed to *brachyptera* has been documented (Moore *et al.* 2013).

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