

Notes on the vocalizations of Long-winged Antwren (*Myrmotherula longipennis*)

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In the following we briefly analyze and compare voice of the different races of Long-winged Antwren (*Myrmotherula longipennis*). We also try to quantify the extent of any vocal differences using the criteria proposed by Tobias *et al.* (2010), as a support for taxonomic review. We have made use of sound recordings available on-line from Xeno Canto (XC) and Macaulay Library (ML).

Loudsong of Long-winged Antwren is a short series of whistled notes. There are however clear differences in song between the various races.

It should be noted however that e.g. song of races from SE Peru to E Brazil show a rather gradual change in voice. Or when looking at all races, it would seem that starting with *longipennis* and going counterclockwise through the Amazon region every next race has some difference with the previous and the next race, a gradual change which leads to a completely different song between *longipennis* and *paraensis*, suggesting somewhat an evolution as a ring species (Fig.1).

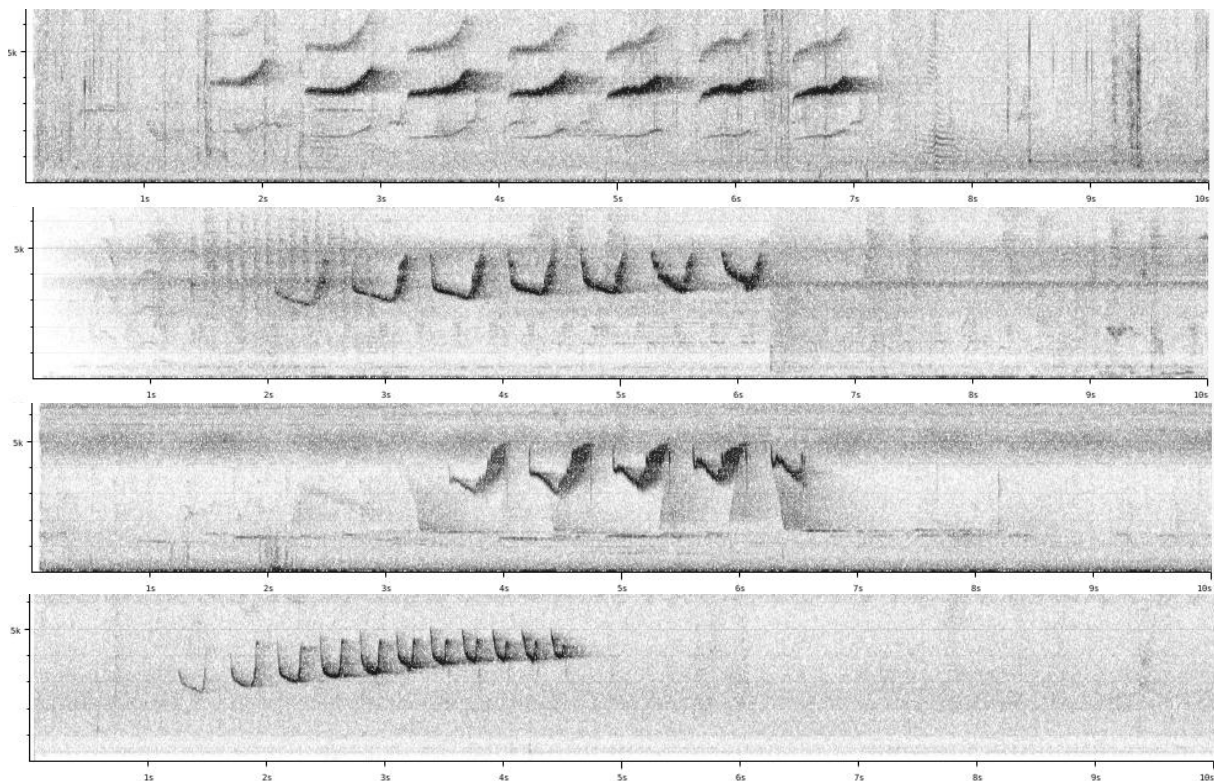


Figure 1: From top to bottom: races *longipennis* (Venezuela), *zimmeri* (Ecuador), *garbei* (Peru), *paraensis* (Brazil)

While *longipennis* has a series of gently rising whistles at roughly the same pitch, this changes step-wise to a rising series of notably under-slurred whistles, shorter in length and delivered at a higher pace in *paraensis*.

It is thus not at all straightforward to cluster the 6 races into a two or more groups.

As an example, some measurements of loudsong of *longipennis* and *zimmeri*, which sound quite different:

longipennis (n=3)

A series of burry slightly rising whistles at roughly the same pitch (or slightly decreasing) over its entire length.

initial freq. first note	3200-3600Hz
end freq. first note	3900-4500Hz
freq. increase first note	600-900Hz
frequency range first note	800-1000Hz
initial freq. last note	3000-3200Hz
end freq. last note	3600-3900Hz
freq. increase last note	600-800Hz
frequency range last note	800-1000Hz
overall frequency range	1300-1600Hz
length first note	0.5-0.65s
length last note	0.4-0.5s
total pace	0.62-0.83
note shape	slightly rising in pitch, lowest frequency at start

zimmeri (n=4)

A series of slightly burry under-slurred whistles gradually increasing in pitch

initial freq. first note	2900-3400Hz
end freq. first note	4300-4400Hz
freq. increase first note	1000-1500Hz
frequency range first note	2000-2700Hz
initial freq. last note	4500-4800Hz
end freq. last note	4600-5300Hz
freq. increase last note	0-600Hz
frequency range last note	1600-1800Hz
overall frequency range	2200-3500Hz
length first note	0.43-0.56s
length last note	0.36-0.47s
total pace	0.6-0.75
note shape	under-slurred, lowest frequency halfway note length

It is clear that there are several frequency-related variables which are different, the most obvious being the overall frequency range (score 2 or 3).

Other independent parameters are less obvious and could at most reach a score 1 (e.g. note shape). This leads to a total score of 2-4.

It is to be expected that side by side comparison of all races will lead to scores in this range (or less). Obviously, when comparing the two extremes, *longipennis* with *paraensis*, score would be about $3+3=6$, reaching almost species-level differences.

All in all, we can conclude that every race shows minor vocal differences with adjacent races, leading to important vocal differences at the two extremes.

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References

Tobias, J.A., Seddon, N., Spottiswoode, C.N., Pilgrim, J.D., Fishpool, L.D.C. & Collar, N.J. (2010). Quantitative criteria for species delimitation. *Ibis* **152**(4): 724–746.

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