

Notes on the vocalizations of Yellow-margined Flycatcher (*Tolmomyias assimilis*)

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In the following we briefly analyze and compare voice of the different races of Yellow-margined Flycatcher (*Tolmomyias assimilis*). 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).

There are clearly 3 vocal groups (Fig. 1):

Central America and Choco region *T. a. flavotectus* (n=8)

Song is very constant: a series of 4-5 high-pitched notes, with a longer pause after first note and subsequent 3-4 notes slightly higher-pitched, equally paced and nearly identical. On a sonogram notes are clear-cut nicely rounded and overslurred.

max. freq.	7350-8500Hz
max. note length	0.11-0.16s
min. freq.	6100-7100Hz
min. pause	0.30-0.39s
total freq. range	4900-6000Hz
min note length	0.067-0.15s
freq. bands	1

N of Amazon *T. a. neglectus* *T. a. examinatus* (n=6)

Song is a variable series of a few drawn-out extremely nasal, almost screaming notes, on a sonogram apparent by a large number of equidistant frequency bands. All notes at about the same pitch, and are symmetrical and overslurred.

max. freq.	3450-5000Hz
max. note length	0.36-0.50s
min. freq.	3200-5000Hz
min. pause	0.32-1.15s
total freq. range	1800-3500Hz
min note length	0.34-0.46s
freq. bands	7-11 (at about 300Hz distance)

S of Amazon *T. a. obscuriceps* *T. a. clarus* *T. a. assimilis* *T. a. paraensis* *T. a. calamae* (n=10)

Song is a variable series of a few slightly buzzy notes. Notes typically rise in pitch, and are asymmetrical on a sonogram. Note shapes vary considerably among races.

max. freq.	3100-4140Hz
max. note length	0.22-0.48s
min. freq.	2500-3100Hz
min. pause	0.20-0.9s
total freq. range	1100-2500Hz
min note length	0.20-0.44s
freq. bands	1 (with slightly burry appearance)

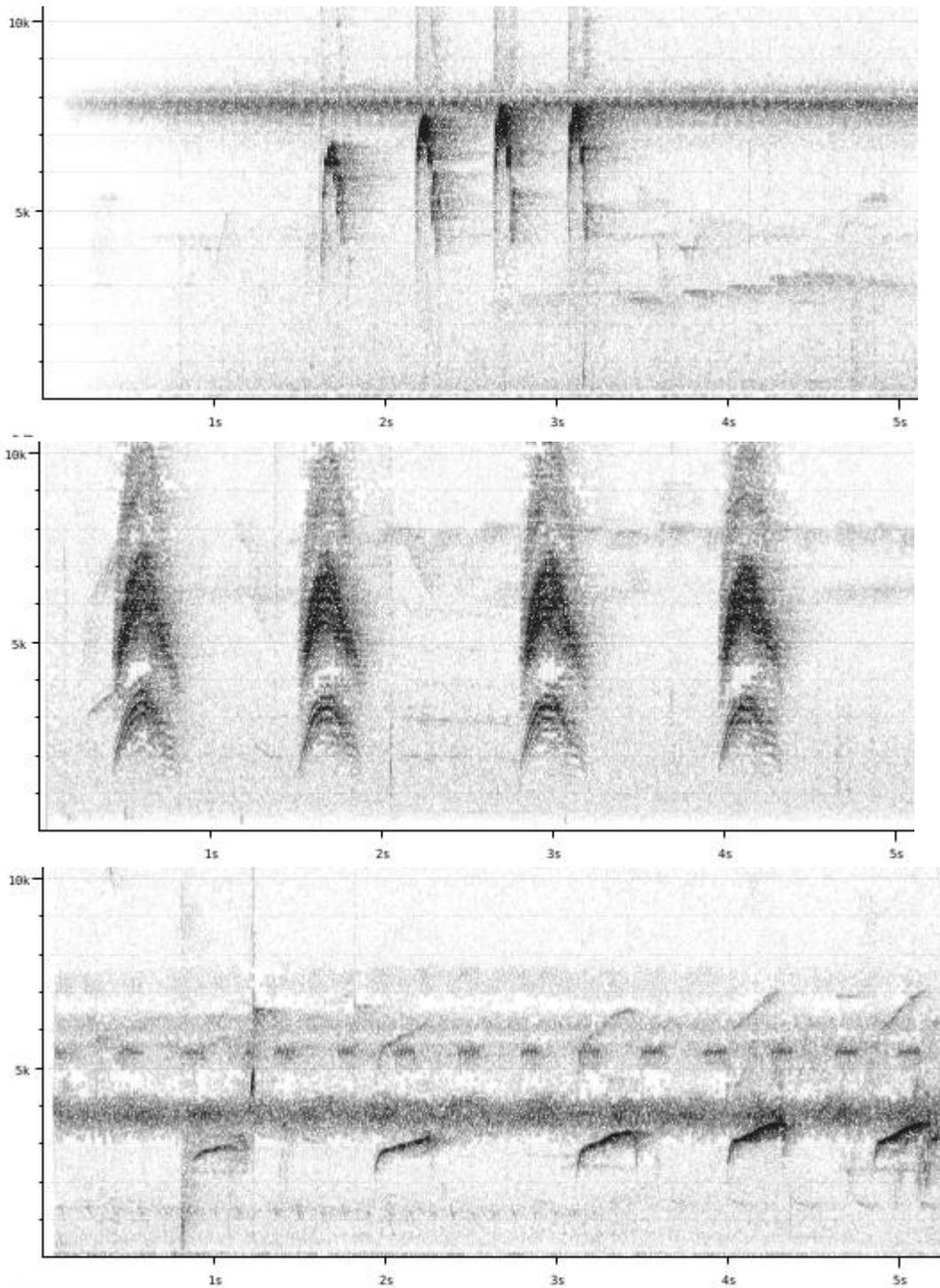


Figure 1: from top to bottom: Typical song of *flavotectus*, N of Amazon group and S of Amazon group

flavotectus is clearly different from all remaining races, reaching much higher frequencies (score 3-4) and having a very large frequency range (score 3), having much shorter notes (score 3-4). The constant rhythmic pattern is also diagnostic (other vocal groups only occasionally having this rhythm). When applying Tobias criteria, this would lead to a total vocal score of about 7.

N of Amazon *T. a. neglectus* *T. a. examinatus* is readily identified by its extremely harsh notes. It differs from birds S of the Amazon by reaching slightly higher frequencies (score 1) with all notes at about the same pitch (score 2-3) and the screechy notes reflected on a sonogram by many equidistant frequency bands (score 2-3). Total vocal score about 5.

There are still differences among races south of the Amazon, principally in note shape, which would require further work to unravel.

In this context, there is also the newly described *sucunduri* ($n=2$)

max. freq.	3750-4400Hz
max. note length	0.36-0.40s
min. freq.	3000-3500Hz
min. pause	0.3-0.6s
total freq. range	1600-2800Hz
min note length	0.24-0.30s
freq. bands	1 (with distinct modulated appearance)

Based on these 2 recordings (available from the IBC website) and above measurements, overall song structure is similar to birds S of the Amazon, with none of the basic sound parameters highly distinct (a score of 1 for a higher max. freq. for any note in the song). What is most distinct is the 'modulated' note shape, which in fact is a composite of a fast series of pulses (there are a few examples of other races S of the Amazon showing some modulation, but never so outspoken as the *sucunduri* examples) (score 1-2). This would lead to a vocal score of 2-3 vs. birds S of the Amazon (and about 4 vs. birds N of the Amazon).

This note was finalized on 3rd September 2015, using sound recordings available on-line at that moment. We would like to thank in particular the many sound recordists who placed their recordings for this species on XC.

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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