

## Notes on the vocalizations of Western Bonelli's Warbler (*Phylloscopus bonelli*) and Eastern Bonelli's Warbler (*Phylloscopus orientalis*)

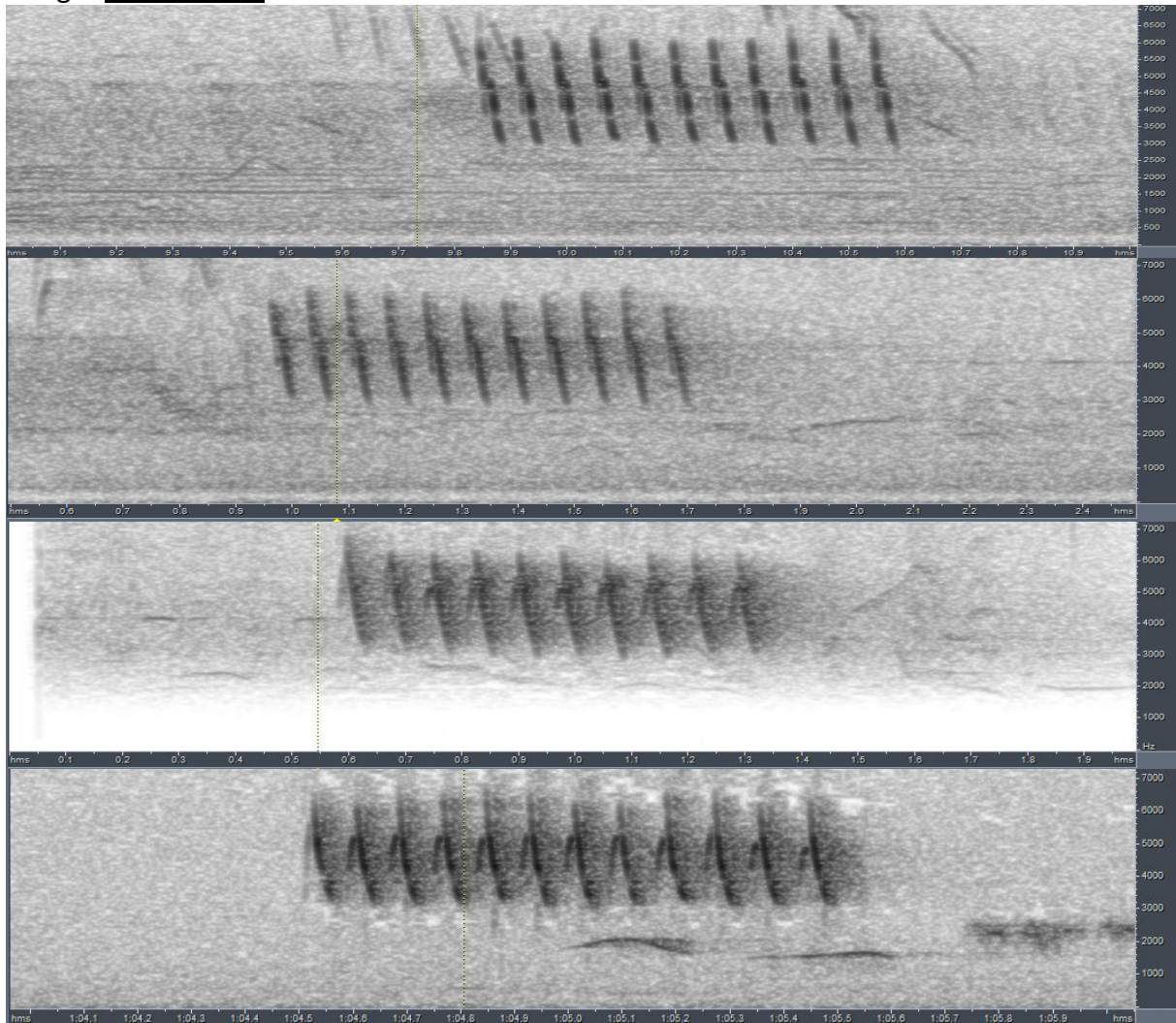
Peter Boesman

In the following we briefly analyze and compare voice of Western Bonelli's Warbler (*Phylloscopus bonelli*) and Eastern Bonelli's Warbler (*Phylloscopus orientalis*). 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).

While the difference in call between both taxa is very obvious, the differences in song are more subtle. A comparison illustrated with sonograms:

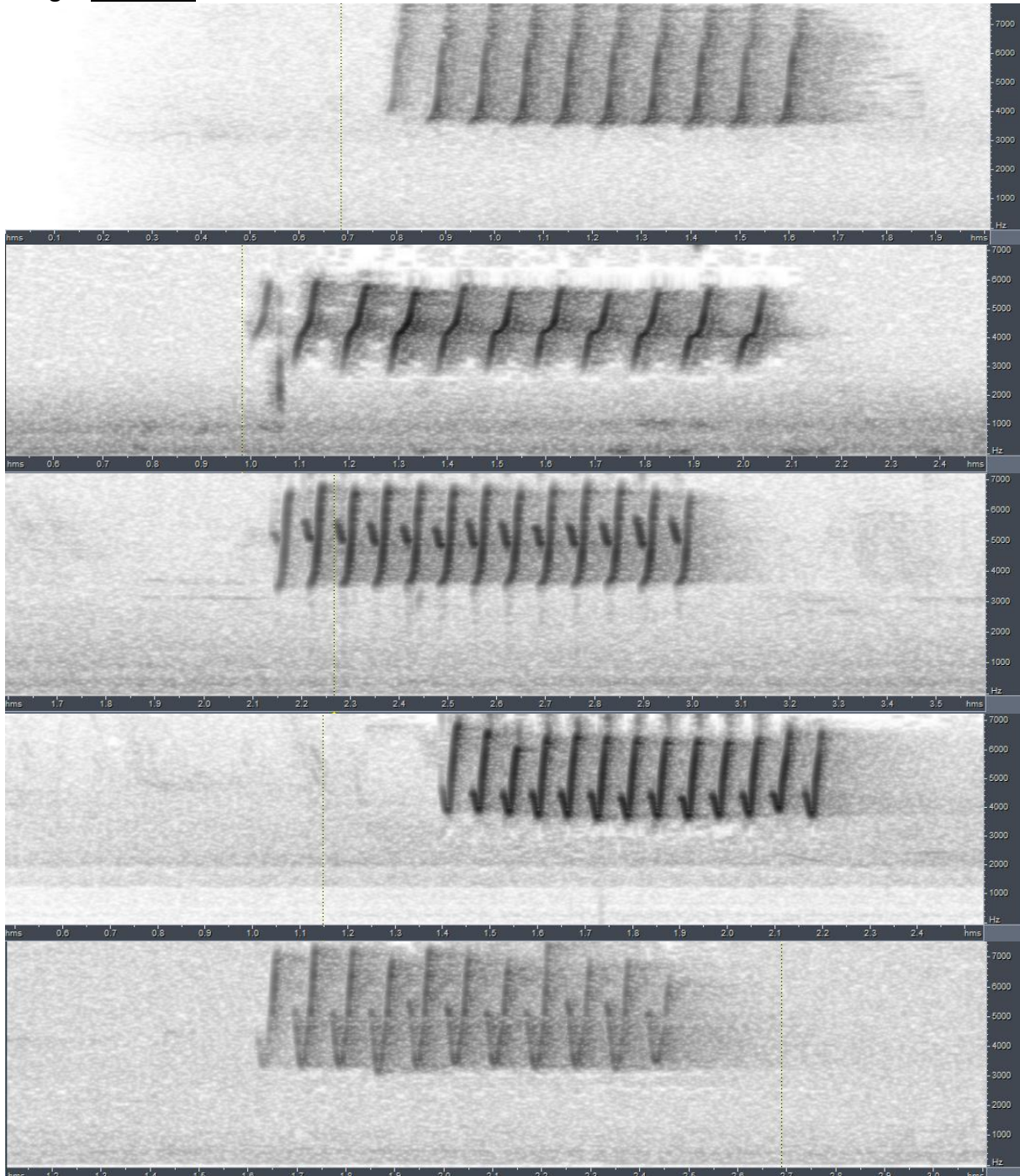
### orientalis

Song is a fast repetition of a single note or double note. In all cases the main component is a straight downslurred note.



*bonelli*

Song is a fast repetition of a single note or double note. In all cases the main component is a straight upslurred note.



Both songs are thus easily identified on a sonogram, based on note shape (score 1-2). Basic sound parameters seemingly differ less, also because pace and pitch varies somewhat among individuals with neighbouring territories. We have nevertheless measured the following sound parameters:

<i>orientalis</i>	range	average	SD
pace (period)	0.070 - 0.080s	0.076s	0.004s
max. freq.	5400 - 6500Hz	6072Hz	400Hz
min. freq.	2700 - 3400Hz	3012Hz	211Hz
total duration	0.62 - 0.97s	0.74s	0.11s
freq. range	2000 - 3450Hz	3027Hz	490Hz

<i>bonelli</i>	range	average	SD
pace (period)	0.070 - 0.100s	0.086s	0.011s
max. freq.	6000 - 7900Hz	7070Hz	490Hz
min. freq.	2600 - 3600Hz	3140Hz	355Hz
total duration	0.62 - 1.18s	0.86s	0.15s
freq. range	3400 - 4200Hz	3930Hz	325Hz

Which leads to the following comparison and calculation of effect size:

	Effect size	score
pace (period)	1.21	1
max. freq.	2.23	2
min. freq.	0.44	0
total duration	0.91	1
freq. range	2.17	2

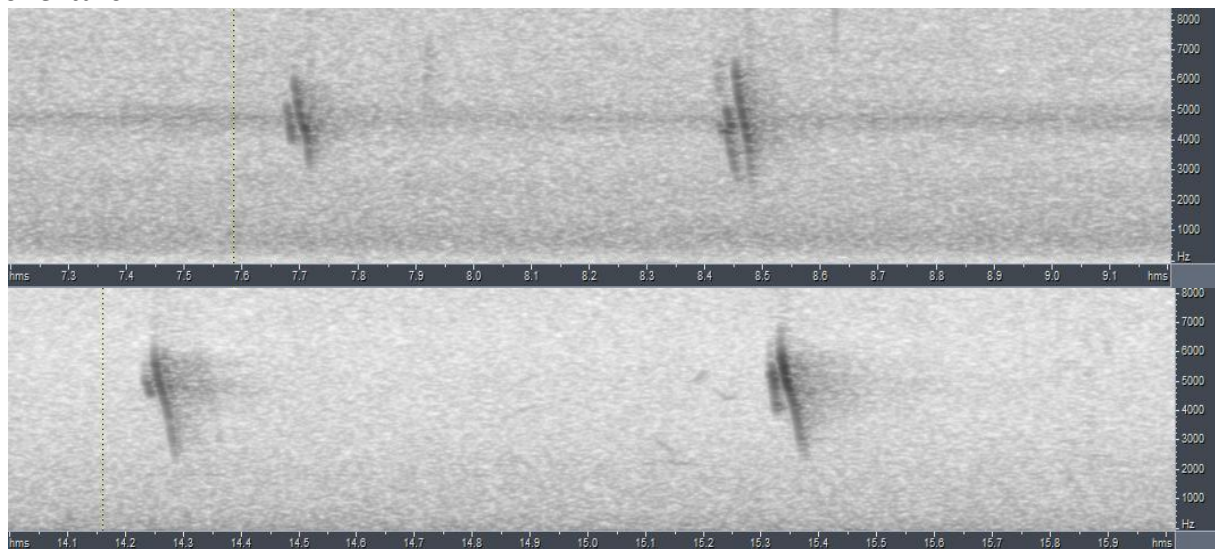
The most important differences besides the note shape, are thus that *bonelli* reaches higher frequencies, has a larger frequency range and on average a somewhat slower pace.

When applying Tobias criteria, this leads to a total vocal score for song of 3-4.

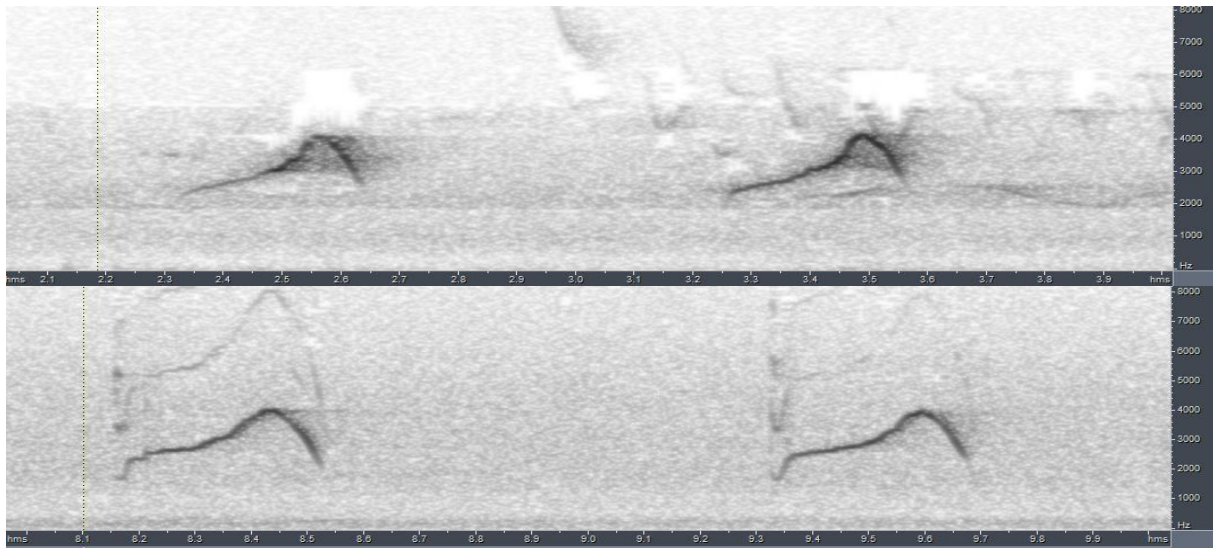
Groenendijk *et al.* (2011) also compared song of both taxa reaching similar results. They concluded that the main differentiating parameters were shape of the trill elements, maximum frequency, number of notes per trill and length of trill. In our set of recordings, number of notes and length of trill were hardly differentiating parameters.

The differences in the main call note are much more striking, we only treat them briefly here:

*orientalis*



*bonelli*



Scoring this main call would lead to higher scores, based on max. freq. (much higher in *orientalis*, score 3), note length (much higher in *bonelli*, score 3-4), double vs. single note (score 3-4) etc., leading to a total vocal score for call of about 7.

This note was finalized on 11th November 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

Groenendijk, D. and Luijendijk, T.J.C. (2011). Variation and difference in song between Western Bonelli's Warbler and Eastern Bonelli's Warbler. *Dutch Birding* 33: 1-9.

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.

### Recommended citation

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