

S1SongSimilarity

Article title: Interspecific avoidance of song overlap in tropical songbirds – species-specific responses to acoustically similar and different intruders

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Sound recording and analysing

During the experiment the acoustic response of tested individuals was recorded by using Marantz PMD661 recorder connected to a Sennheiser ME67 shotgun microphone with a K6 powering module (wav files, 48 kHz/16-bit sampling, mono recording). In each territory we chose first 10 high quality songs (18 males of scaly-breasted illadopsis and 19 males of green-backed camaroptera). Using Raven Pro 1.6.4 (Hann window, 1024 window size, overlap = 87%) we automatically measured: (1) Freq 25% [Hz] – frequency below which 25% of the total energy of the signal is distributed; (2) Freq 75% [Hz] – frequency below which 75% of the total energy of the signal is distributed; (3) Peak Freq [Hz] – frequency of maximal amplitude. The same measurements we also conducted on song samples used as sounds of acoustically similar and acoustically different species (three individuals of each species, one song from one individual). Measurements are available in S1SongSimilarity.xlsx file.

Song characteristics

We compared basic spectral parameters (Freq 25%, Freq 75%, Peak Freq) between studied species and sound samples used as an acoustically similar and acoustically different intruders.

Green-backed camaroptera

We measured 190 songs in 19 territories (10 songs in each territory). The mean Freq 25% was equal 2940 Hz (SD = 386.3 Hz, range from 1969 Hz to 3891 Hz), mean Freq 75% was equal 3817 Hz (SD = 451.7 Hz, range from 2813 Hz to 5109 Hz), Peak Freq was equal 3413 Hz (SD = 566.7 Hz, range from 1781 Hz to 4875 Hz). The 50% of energy of the signal was located on average between 2940 Hz and 3817 Hz (range for the species from 1969 Hz to 5190 Hz).

As an acoustically similar species to green-backed camaroptera we used marsh tit, which Freq 25% ranged from 2972 Hz to 3316 Hz, Freq 75% ranged from 4048 Hz to 4350 Hz, Peak Freq from 3101 Hz to 3359 Hz.

As an acoustically different species to green-backed camaroptera we used Eurasian treecreeper, which Freq 25% ranged from 55127 Hz to 5599 Hz, Freq 75% ranged from 6589 Hz to 7063 Hz, Peak Freq from 6503 Hz to 7020 Hz. The comparison of song characteristics of green-backed camaroptera and sound samples used as acoustically similar and acoustically different species is shown in Figure 1.

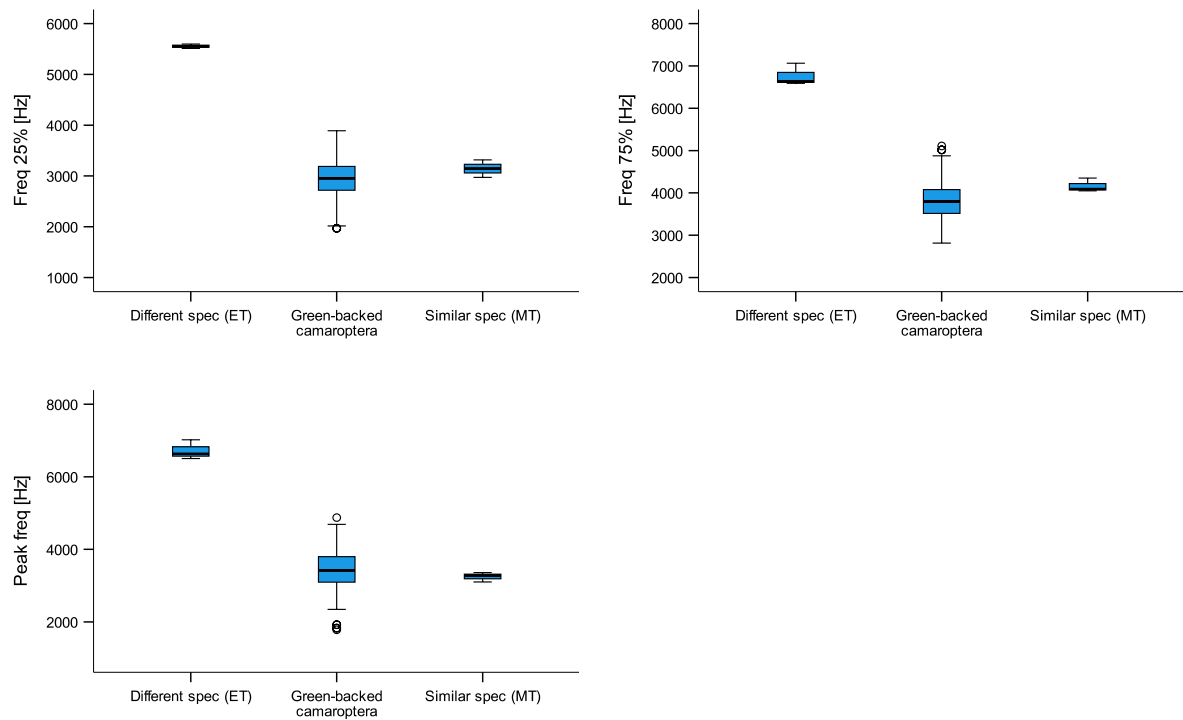


Figure 1. Comparison of basic spectral characteristics of song of green backed camaroptera and song samples used in playback experiment as acoustically different (Eurasian treecreeper) and acoustically similar (marsh tit) intruders to the tested species. Median values, 25% and 75% quartiles and outliers are given.

Scaly-breasted illadopsis

We measured 180 songs in 18 territories (10 songs in each territory). The mean Freq 25% was equal 2613 Hz (SD = 56.1 Hz, range from 2484 Hz to 27191 Hz), mean Freq 75% was equal 2705 Hz (SD = 48.0 Hz, range from 25783 Hz to 2766 Hz), Peak Freq was equal 2648 Hz (SD = 77.2 Hz, range from 24371 Hz to 2812 Hz). The 50% of energy of the signal was located on average between 2613 Hz and 2705 Hz (range for the species from 2484 Hz to 2766 Hz).

As an acoustically similar species to scaly-breasted illadopsis we used Papuan treecreeper, which Freq 25% ranged from 2627 Hz to 2775 Hz, Freq 75% ranged from 2670 Hz to 2815 Hz, Peak Freq from 2627 Hz to 2815 Hz.

As an acoustically different species to scaly-breasted illadopsis we used Eurasian treecreeper, which Freq 25% ranged from 4827 Hz to 4996 Hz, Freq 75% ranged from 5870 Hz to 6546 Hz, Peak Freq from 5931 Hz to 6546 Hz. The comparison of song characteristics of scaly-breasted illadopsis and sound samples used as acoustically similar and acoustically different species is shown in Figure 1.

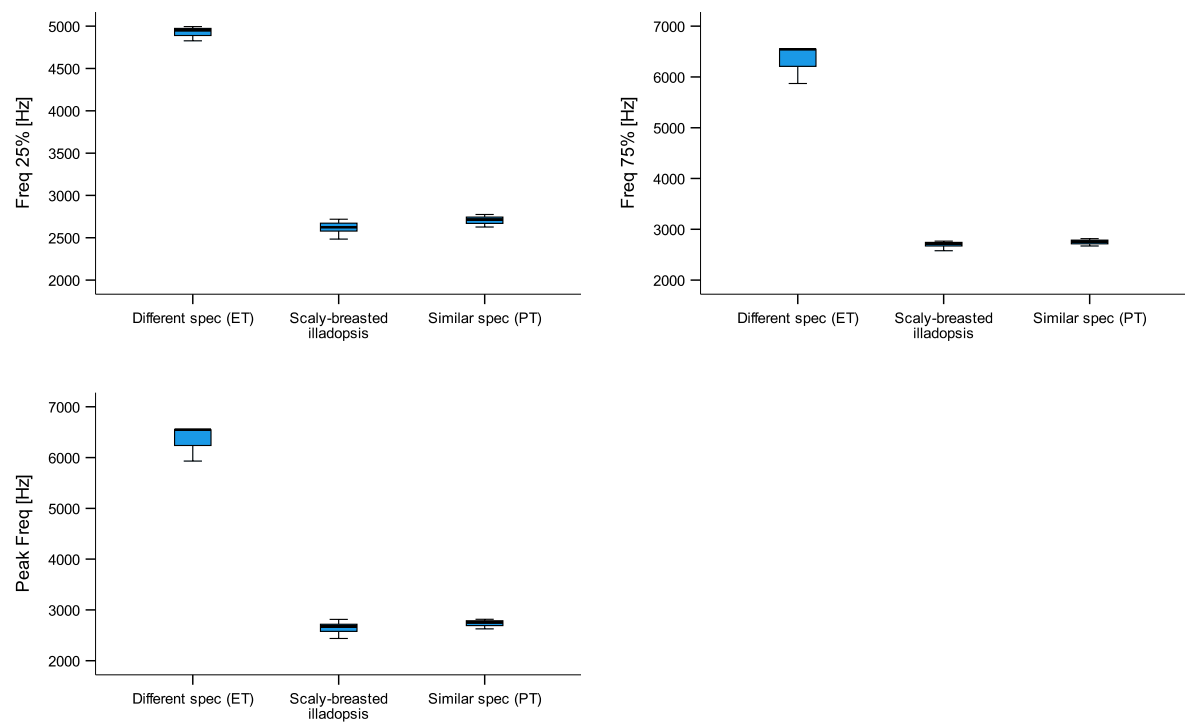


Figure 2. Comparison of basic spectral characteristics of song of scaly-breasted illadopsis and song samples used in playback experiment as acoustically different (Eurasian treecreeper) and acoustically similar (Papuan treecreeper) intruders to the tested species. Median values, 25% and 75% quartiles and outliers are given.