

Low frequencies in the display vocalization of the Western Capercaillie

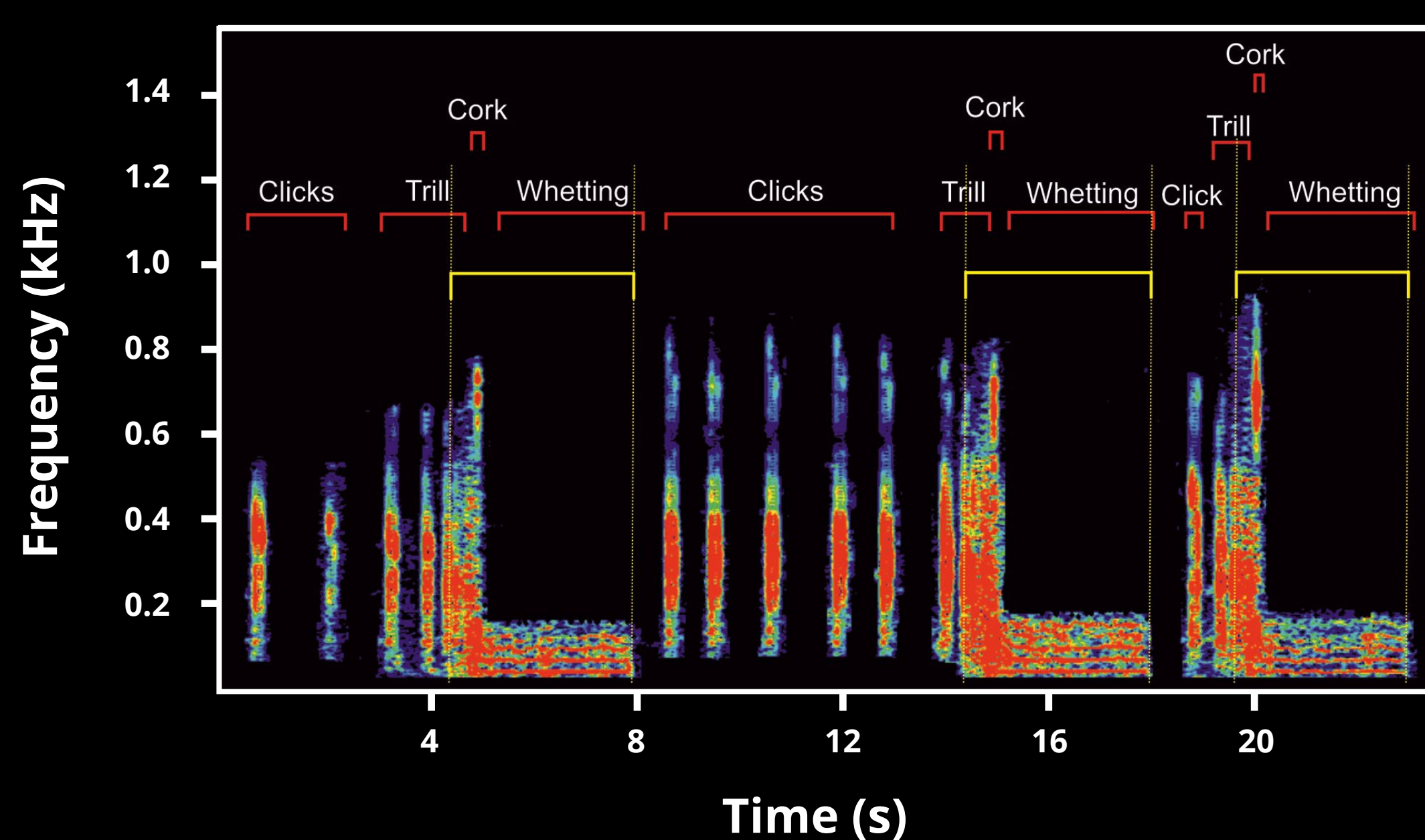


BACKGROUND

Only a few bird species are known to produce low-frequency vocalizations. While **sound communication in the range of human hearing has been intensively studied**, very little is known about usage of sound below that range.

METHODS

We analyzed **display vocalizations of the Western Capercaillie (*Tetrao urogallus*) males kept in breeding centers**. Typical display vocalization of the Western Capercaillie contains four phases: Clicks, Trill, Cork, and Whetting.

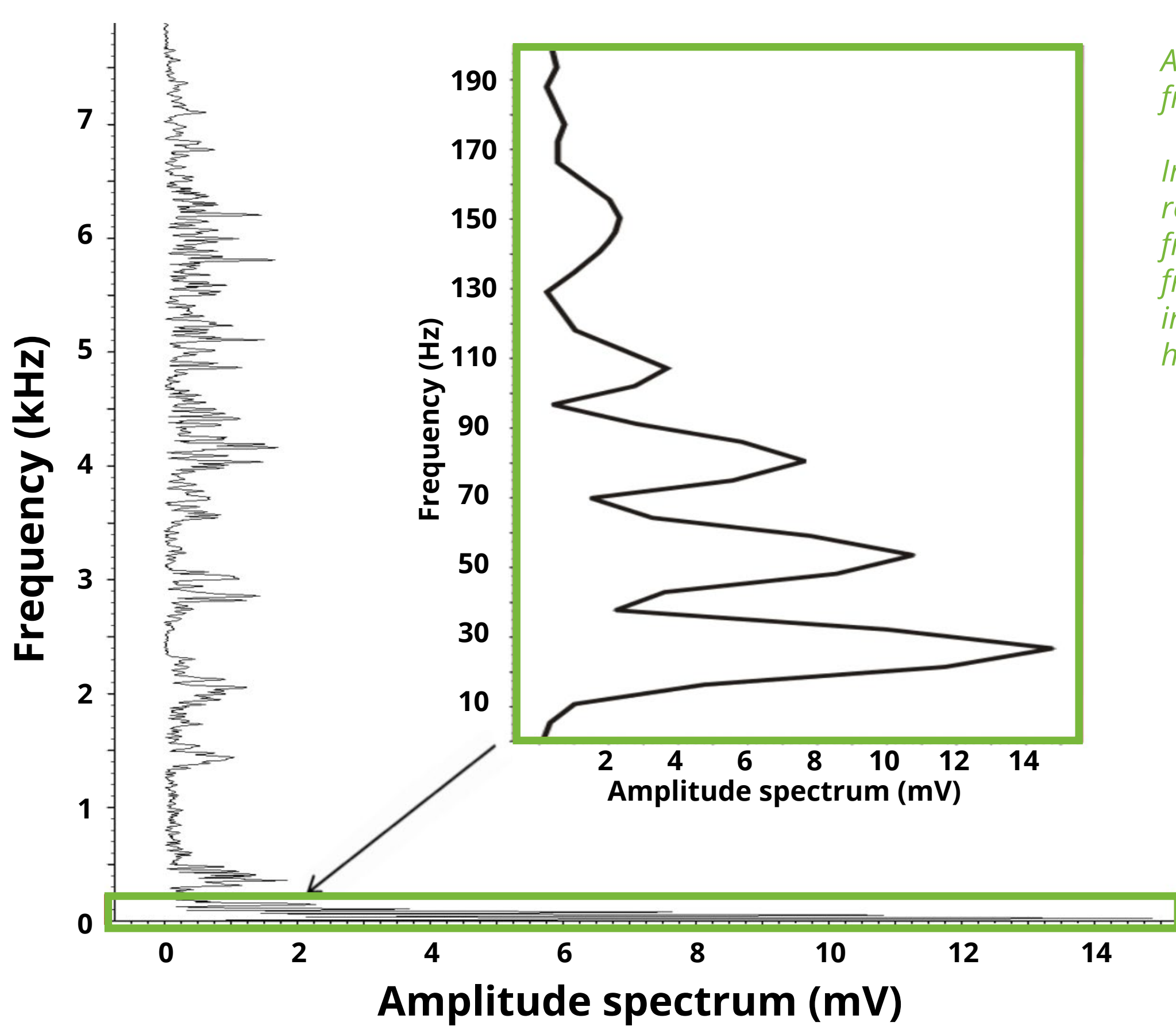
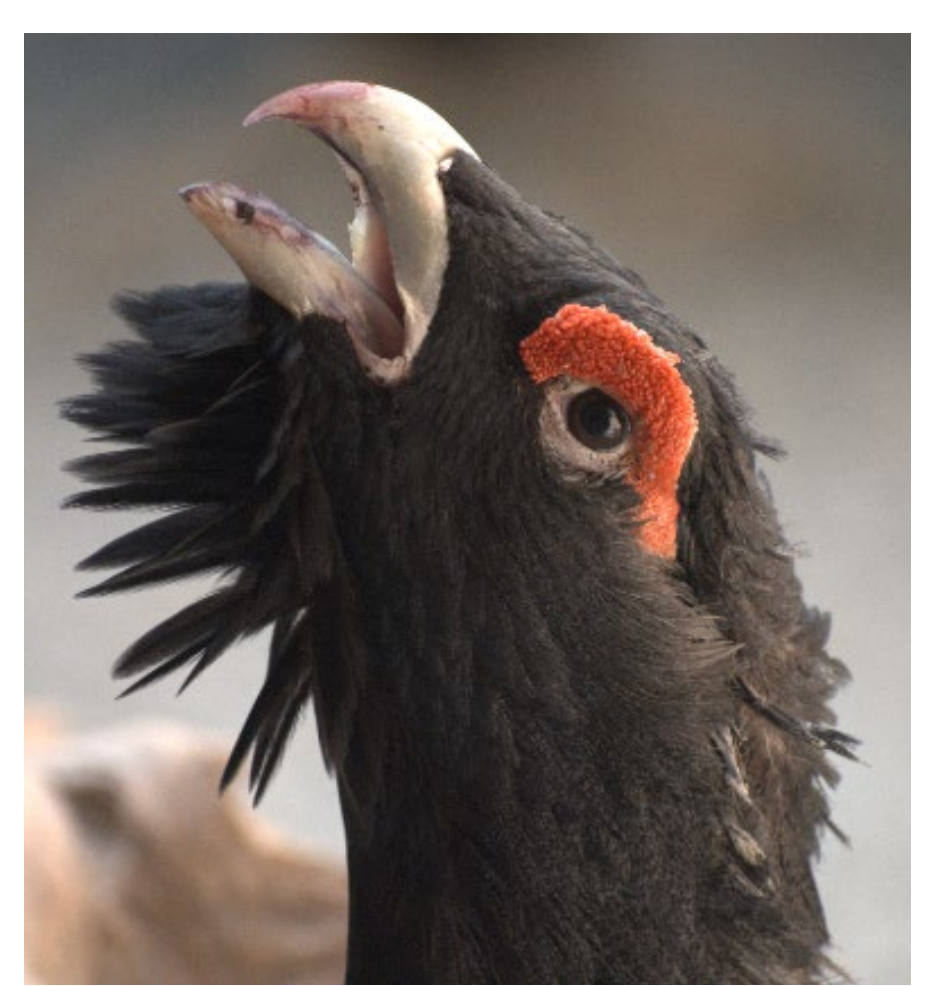


A spectrogram of the low-frequency part (as delimited by horizontal yellow lines) of three subsequent display vocalizations of the Western Capercaillie.

RESULTS

We identified harmonically structured signals with a fundamental frequency of 28.7 ± 1.2 Hz.

These low-frequency components **temporally overlap with the Whetting phase** and they significantly contribute to individuals' distinct vocal expressions.



Amplitude spectrum of the low-frequency component.

Increased frequency resolution (green rectangle) reveals a fundamental frequency of 27 Hz. This fundamental frequency also represents the most intensive frequency with three harmonic frequencies.

CONCLUSIONS

The **occurrence of such low frequencies is surprising** as this grouse is substantially smaller than other cassowaries that produce similar low frequencies. Because these low-frequency components overlap temporally with the Whetting phase, they are **hardly audible from a distance larger than several meters**. The individually distinct pattern suggests that this influences sexual selection. This low-frequency phase also correlates with the period of temporary deafness known to occur only during the Whetting phase, which hunters exploit.



We suggest that while **it may be advantageous for communicating and impressing conspecifics to vocalize in very low frequencies**, the **Western Capercaillie pays with temporary deafness while calling**.