

Public Abstract

First Name:Carlos

Middle Name:C

Last Name:Martinez Rivera

Adviser's First Name:H. Carl

Adviser's Last Name:Gerhardt

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:CALL TIMING INTERACTIONS, AGGRESSIVE BEHAVIOR, AND THE ROLE OF ACOUSTIC CUES IN CHORUS FORMATION IN TREEFROGS

Most animals produce signals that can be perceived by more than one receiver, making the social environment where acoustic communication occurs a significant factor shaping their social behavior. However, the complex social environment in which long range acoustic communication takes place remains largely unstudied. One such environment is a chorus, the large breeding aggregations where individuals use acoustic signals as sexual displays. Choruses are dynamic, socially complex communication networks that function as focal points for sexual selection.

I studied the calling patterns and aggressive behavior of the bird-voiced treefrog *Hyla avivoca*, to assess how dynamic call characters influences males in a chorus and the factors influencing the onset of choruses and settling patterns of males in a chorus. Frogs calling in groups or in response to playbacks produced longer calls than isolated males and often engaged in aggressive calling and fights. During call overlap, males increased the duration of the silent interval (gaps) between the pulses so that pulses interdigitated. Aggressive behavior is pervasive in males of this species, however, males resort to aggression during the early hours of chorus formation, when females are not present. During aggressive interactions, males seem to indicate their propensity to engage in a fight over a calling area without showing signs that opponents evaluate the ability of a rival.

Females preferred long calls to short and average-duration calls, and non-overlapped calls to overlapped calls. They also preferred pairs of calls in which overlap was low and pairs of calls in which pulses interdigitated completely. Females failed to respond to aggressive calls presented alone, but approached playbacks broadcasting a combination of advertisement and aggressive calls. Male playback experiments showed how changes in dynamic call properties through vocal competition affect male mating success, reflecting the preferences of females, which have influenced the evolution of male calling behavior.

I also studied the role of acoustic signals on chorus formation and location on *H. avivoca* and *H. arenicolor*. I performed seasonal and daily onset experiments broadcasting calls that simulate an early chorus, both at the beginning of the season and nightly before the onset of chorus formation. Males exposed to playbacks descended earlier from the canopy and formed a chorus-like aggregation around speakers, males in other areas did not come down. Males sat and formed choruses next to speakers broadcasting attractive calls. Speakers that broadcast calls from ecologically similar areas, but where the chorus does not form naturally failed to attract *H. avivoca* but attracted *H. arenicolor*. My data suggests that males may benefit from settling next to attractive males and that calls influences the behavior of males by attracting individuals to the established chorusing area, and to new areas within the breeding area in some species.