

Sound Production and Perception in American Lobsters (*Homarus Americanus*)

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Lobsters have been known to make sound since the late 1800s, but a lot remains unknown about the characteristics of the noises they make, and the purpose of the noises themselves (Moulton, 1957). American lobsters (*Homarus americanus*) have been known to ‘buzz’ by vibrating their carapace when threatened, such as while being picked up or when in the presence of a predator (Henninger and Watson, 2005; Ward et al., 2011). In this project, I evaluated lobsters’ reactions to different types of sound when isolated in a tank. The results of this study can help us to understand the possible importance of sound production in the intraspecific interactions of American lobsters.

First, I exposed 7 American lobsters caught from the Harpswell Sound to silence, white noise, and a lobster buzz recording, and evaluated their behavior following the stimulus to determine whether the hums elicited different reactions than other sounds. Overall, lobsters did not seem to significantly react to the lobster hum sound, and were more likely to visibly react to the white noise (Fig. 1).

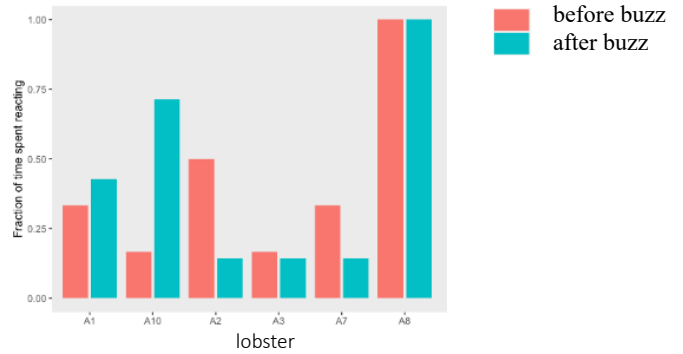


Fig. 1. Fraction of time spent reacting for six different lobsters before and after being exposed to a recording of a lobster buzz.

While conducting tests with lobsters in a dark tank, I observed a noise that - to my knowledge - has not previously been reported. This noise is of a much higher frequency than the well-documented hums, and structurally resembles an exponential harmonic chirp (Fig. 2). Buzzes have a frequency of about 200 Hz (Henninger and Watson, 2005), whereas the high-pitched chirps I picked up had maximum frequencies of around 15 kHz. I am fairly certain that I have ruled out possible artefactual origins of the chirp such as the settling of the tank itself, or the scraping of lobster carapace on the sides of the tank. I will be conducting further tests to determine the structure and origin of the chirp in my honors thesis this year.

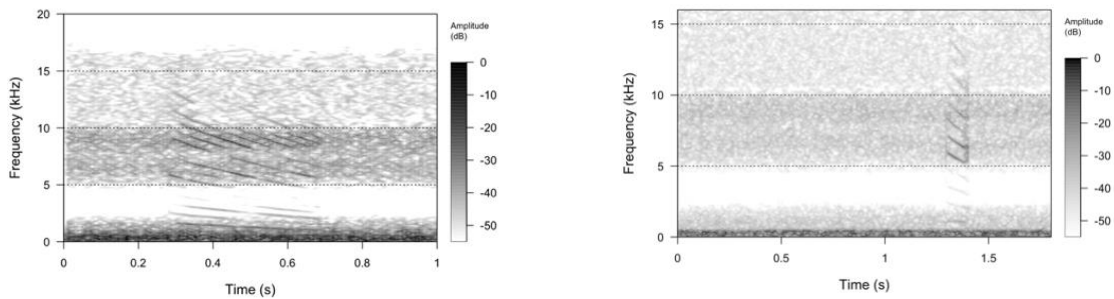


Fig. 2. Two examples of chirps I observed while conducting tests with lobsters in dark tanks. The x-axis shows time, the y-axis shows frequency in kHz, and the color-palette indicates the amplitude of the sound pictured.

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Reference

Henninger, H.P., & Watson, W.H.III. 2005 Mechanisms underlying the production of carapaces vibrations and associated waterborne sounds in the American lobster, *Homarus americanus*. *Journal of Experimental Biology*. **17**: 3421-3429.

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Ward, D., Morison, F., Morrissey, E., Jenks, K., & Watson III, W. H. 2011. Evidence that potential fish predators elicit the production of carapace vibrations by the American lobster. *Journal of Experimental Biology*. **214**:2641-2648.