Detection of transient communication signals in weakly electric fish

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A

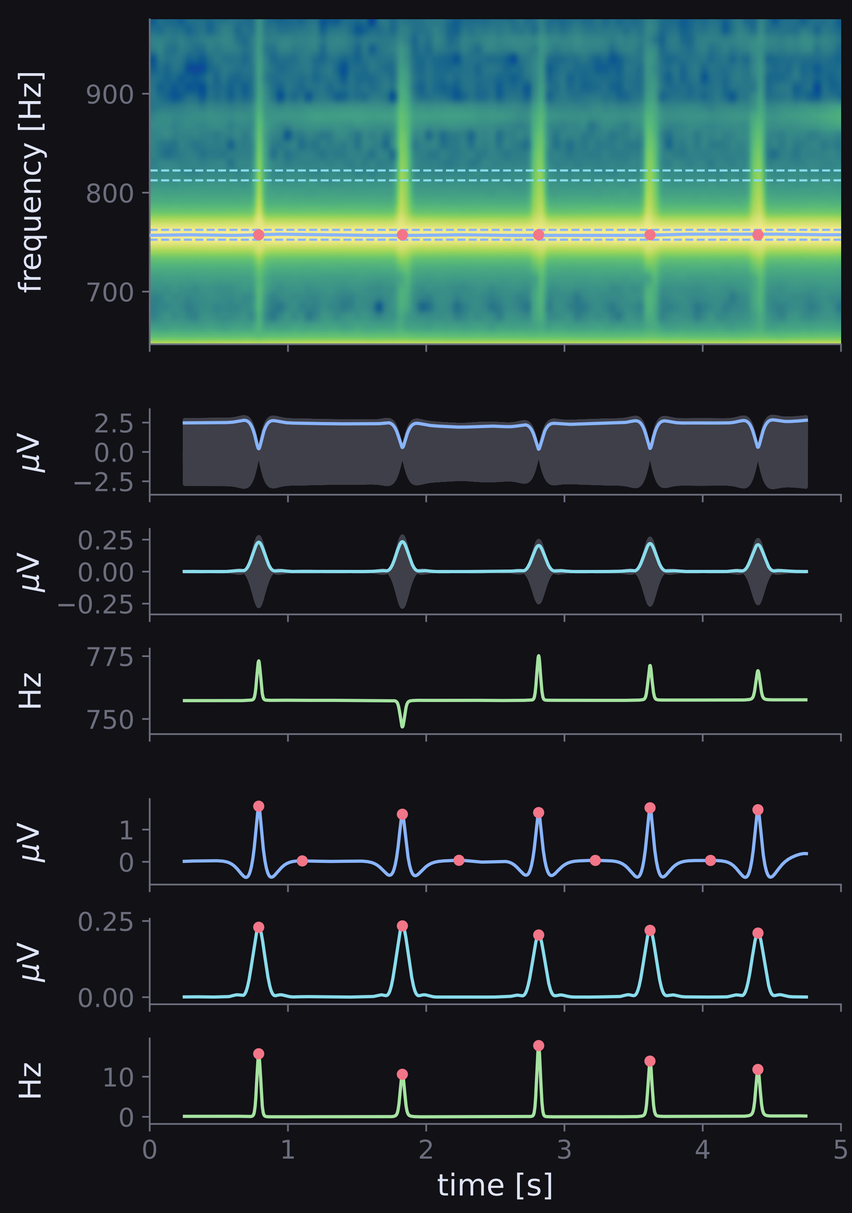
Introduction

The time-frequency tradeoff makes reliable signal detecion and simultaneous sender identification of freely interacting individuals impossible. This profoundly limits our current understanding of chirps to experiments with single - or physically separated - individuals.

Chirps during competition

B

Chirp detection



Interactions at modulations

C

- $\triangle$EODf does not appear to decrease during synchronous modulations ().
- Individuals that rise their EODf first appear to rise their frequency higher compared to reactors (**B**).
- Synchronized fish keep distances below 1 m (**C**) but distances over 3 m also occur (see **movie**).
- Spatial interactions increase **after** the start of a synchronous modulation (**D**).

Conclusion

- Our analysis is the first to indicate that *A. leptorhynchus* uses long, diffuse and synchronized EODf signals to communicate in addition to chirps and rises.
- The recorded fish do not exhibit jamming avoidance behavior while close during synchronous modulations.
- Synchronous signals **initiate** spatio-temporal interactions.

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