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Behavioral Thresholds of Weakly Electric Fish Depend on Precise Temporal Pattern of Communication Signals

Chelsea Casareale

Mentor: Bruce Carlson

Brienomyrus brachyitus is a species of weakly electric fish that releases pulses of electric discharge (EOD) at varying rates measured as inter-pulse intervals (IPI). This is used for electrolocation and social behavior. While it is known that EODs are specific for species and gender and can be used by the fish to recognize conspecifics, it is unclear if the fish use IPIs for anything other than coding communication patterns. To begin testing the hypothesis that B. brachyitus can use IPIs to distinguish between individuals, threshold responses to six pre-recorded stimuli and five variations of them were recorded. The five variations were Random, Time Reversed, Jitter 1ms, Jitter 3ms, and Jitter 5ms. Of these, the difference in response threshold was significant for Random, Time Reversed, and Jitter 5ms; all of these required a higher playback intensity than the original stimulus to evoke a response from the fish. This begins to point to the fact that B. brachyitus can recognize differences in the IPIs of presented stimuli and, therefore, may be able to use this information to distinguish individuals.