An Attempt To "See" the Behavior of the Japanese Lampreys in the Sandy Mud by Acoustic Analysis

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Ammocoetes, which are the larvae of Lampreys in the genus Lethenteron sp., are known to barely move their bodies when they submerge themselves in sandy substrates. In an experiment using a transparent gel (ground sodium polyacrylate), instead of a sandy substrate, the larval lampreys were observed to employ a movement described here for the first time as “lip sway”, in which they rapidly and repeatedly move their upper lip from left to right in order to submerge themselves in soft sediments. However, it is not clear whether this behavior is also observed in their natural habitat, sandy mud, due to difficulties with conducting observations in sandy sediments. In this study, a sensitive underwater microphone and amplifiers were used to investigate whether ammocoetes performed the lip sway movement in sandy sediments, and we succeeded in recording faint sounds associated with ammocoete movement. Analysis of the audio data and comparison with video data recorded using a transparent gel showed that the frequency of lip sway movements was comparable in the two substrates. Based on these findings, we were able to demonstrate that ammocoetes use lip sway movements in sandy sediments in the same way as they do in sodium polyacrylate. In a 24-hour monitoring experiment using the same equipment, the findings suggested that ammocoetes, like adults, are nocturnal. Moreover, in an experiment using clams instead of ammocoetes, it was found that the sounds produced by the clams could also be recorded. Thus, our method could be used to investigate the very faint sounds made by animals moving in sandy substrates. This method could be effective for surveying the behavior of organisms in sandy substrates that have not been investigated previously.

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