



The effect of anthropogenic noise as a source of acoustic stress in wild populations of *Hippocampus guttulatus* in the Ria Formosa lagoon, south Portugal

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In this experiment, long snout seahorse, *Hippocampus guttulatus* specimens were exposed to potential acoustic stress factors in order to evaluate eventual physiological stress responses. Two different underwater noises with different sound intensities were tested: transient motor boat sound (63.4dB to 127.6dB) and constant sound produced by the motor boat anchored directly above the animals, up to 137.1 dB. A total of 60 fish (49 valid observations) were observed between 4 and 10 meters depth throughout a three minute period using a video camera and a hydrophone set. A significant increase ($p < 0.05$) in the respiratory rate was observed in 87.8% of the observed fish. Opercular movements per minute (OMPM) increased from $35,7 \pm 10$ (control sample) to $41,2 \pm 15,5$ in the first minute of observations, to $45,5 \pm 13,3$ in the second (both under transient sound) and to $49,7 \pm 12,5$ in the third (under constant sound exposure). Significant differences in means between the control fish and fish observed during the second ($p < 0.01$) and third minute of observation ($p < 0.0001$) were observed. Concordantly, a significant increase ($p < 0.05$) in the OMPM of fish observed in the 1st minute and the 3rd minute was noted. In addition to the OMPM increase, 30.6% of the animals abandoned the observation location in an attempt to avoid the negative sound stimuli. Based on the obtained information, results showed a clear impact of underwater anthropogenic noise as a negative stress factor for the wild populations of *H. guttulatus* in the Ria Formosa lagoon.

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