## Supplementary materials

## TABLES

***Table S1*** *The physico-chemical measurement of water*

| Parameters/value | Amount | Device/model |
|---|---|---|
| Temperature (ºC) | 26±1 | Mercury thermometer |
| Light intensity (Lux) | 113.8±2 | Lux meter (model: Digital Lux Meter-GM1010) |
| TDS (ppm) | 160±1 | TDS meter (model: TDS-3) |
| pH | 7.2±2 | pH meter (model: SANA SL-901) |
| $NO_3^-$ (mg/l) | <0.2 | Bante321-$NO_3^-$ Portable Nitrate Ion Meter |
| $NO_2^-$ (mg/l) | 0 | JBL Nitrite Test Kit |
| $NH_4^+$ (mg/l) | 0.21 | Bante321-$NH_4^+$ Portable Ammonium Ion Meter |

***Table S2.*** *Description of behavioural activities by the Red cherry shrimp (Neocaridina davidi) assessed during the experimental tests, based on video playbacks visualizations.*

| Behaviour | Description | Unit | Application test |
|---|---|---|---|
| Movement speed | Mean distance moved by the center point of the subject per unit time | Centimetres/seconds | Single |
| Spatial distribution | The mean attendance of individuals in a specific area | Seconds & Centimetres | Single |
| Food-finding | Number of individuals that succeed to find the food source | Number of individuals | Single |
| Feeding latency | Mean time to find the food source | Seconds | Single |
| Number of revisiting | Number of revisiting to food source for a certain period of time | Number of individuals | Single |
| Feeding distraction | Number of individuals were complete freezing and movement away from the food after sound playback | Number of individuals | Single |

**FIGURES**

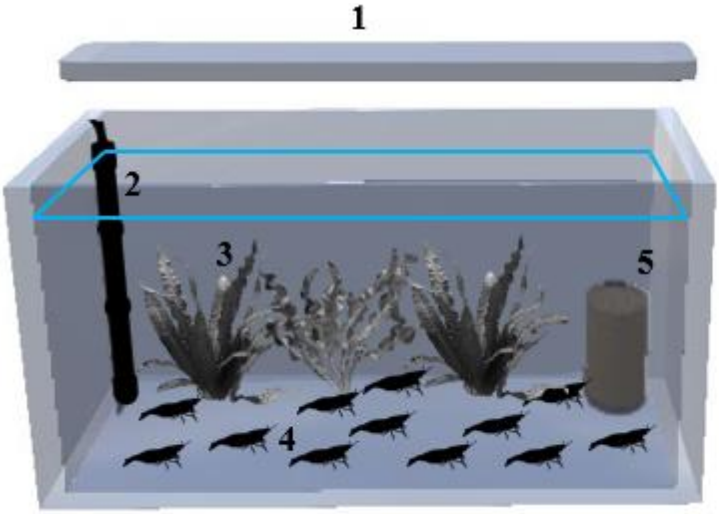


***Figure S1.*** *Experimental configuration to maintain Neocaridina davidi in the holding aquarium. Set up of the holding tank: 48 × 28 × 32 cm and 4 mm wall thickness. 1) LED; 2) heater; 3) aquatic plant; 4) shrimp, and 5) sponge filter.*

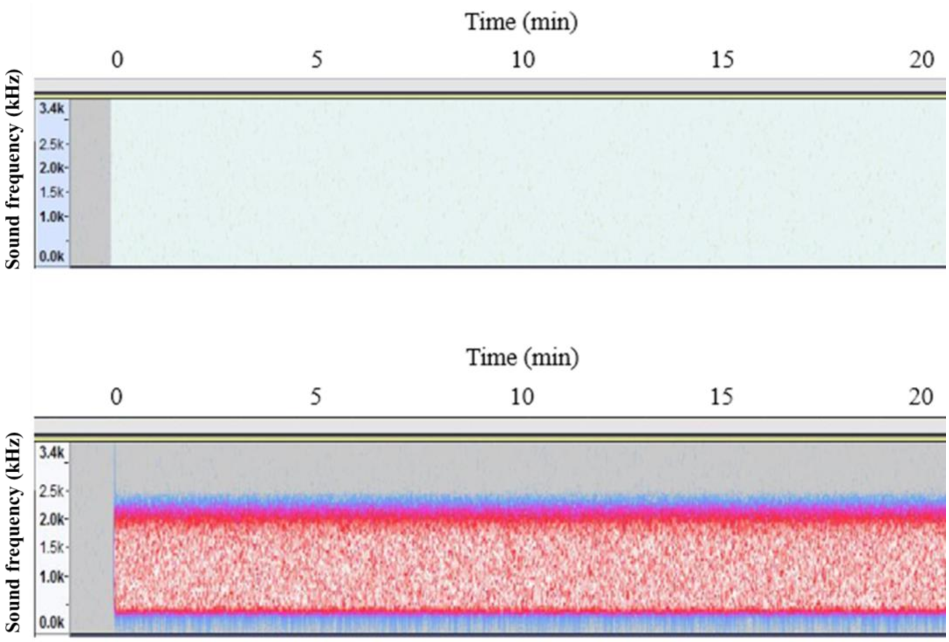


***Figure S2.*** *Spectrogram (for 20 s time slot) magnification of A) Control and B) Sound wave (Sound treatments) used in the experiment: frequency (kHz) vs. time (min). The intensity is reflected by the colour scale (dB re 1 lPa $^{2}$/Hz). We used Audacity software to visualize these figures.*

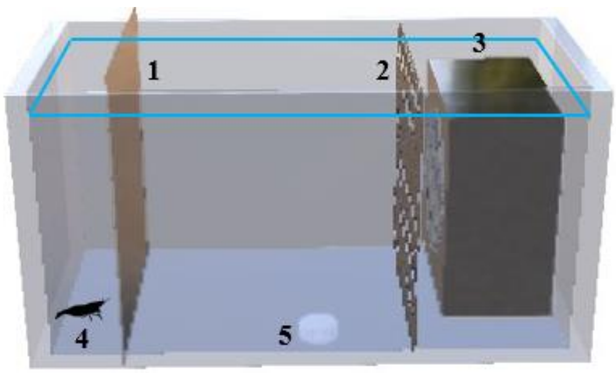


***Figure S3.*** *First experiment set up (40 × 30 × 30 cm), 1) divider, 2) speaker holder, 3) underwater speaker, 4) the shrimp, 5) food source.*

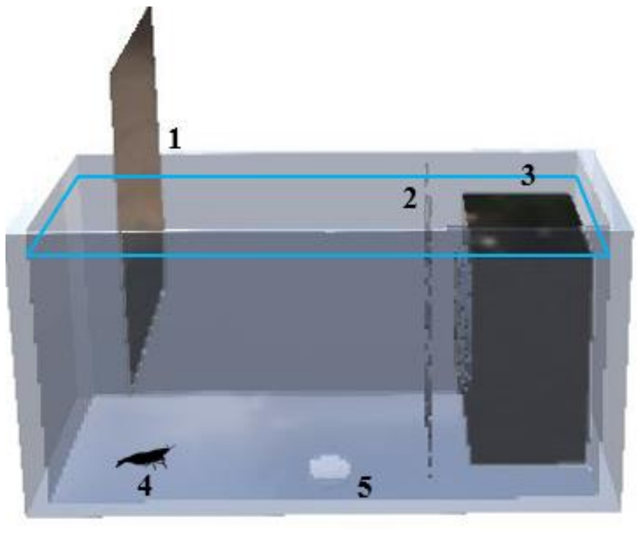


***Figure S4.*** *Second experiment set up (40 × 30 × 30 cm). 1) divider, 2) speaker holder, 3) underwater speaker, 4) the shrimp, 5) food source.*

**Acoustic Stimuli validity for invertebrates**

The red cherry shrimp were exposed to a 400-2000 Hz acoustic stimulus mimicking a frequency bandwidth range that they can detect and which represents the frequencies produced by human activities that shrimp are exposed to in their natural habitats and at rearing facilities (Lovell et al., 2005; Slater et al., 2020). The continuous sound with this frequency range was chosen due to its' similarity to the sound of motor boats, aeration pumps, and filtration systems that are commonly used on farms (Peng et al., 2015).


Lovell, J. M., Findlay, M. M., Moate, R. M., Yan, H. Y., 2005. The hearing abilities of the prawn *Palaemon serratus*. Comp. Biochem. Physiol. A Mol. Integr. Physiol. 140(1), 89-100. https://doi.org/10.1016/J.CBPB.2004.11.003.

Peng, C., Zhao, X., Lio, G., 2015. Noise in the sea and its impact on marine organisms, International Int. J. Environ. Res. Public Health, 12, 12304-12323. https://doi.org/10.3390/ijerph121012304

Slater, M., Fricke, E., Weiss, M., Rebelein, A., Bögner, M., Preece, M., Radford, C., 2020. The impact of aquaculture soundscapes on whiteleg shrimp *Litopenaeus vannamei* and Atlantic salmon *Salmo salar*. Aquac. Environ. Interact. 12, 167-177. https://doi.org/10.3354/AEI00355