The following supplement accompanies the article

Sensitivity of the mussel *Mytilus edulis* to substrate-borne vibration in relation to anthropogenically generated noise

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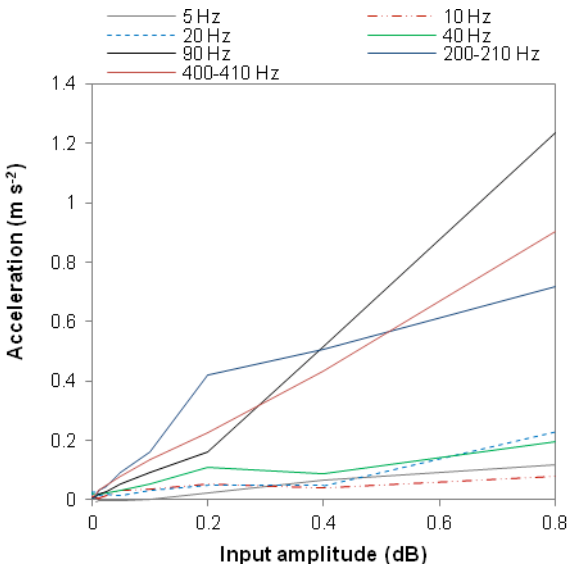

Fig. S1. Dynamic range of the shaker excitation system measured with a Brüel & Kjær piezo-electric accelerometer (Type 4333, sensitivity 20.60 mV/g). Maximum shaker input amplitude is 0 dB (1.2 m s^{-2}), reducing in 6 dB steps

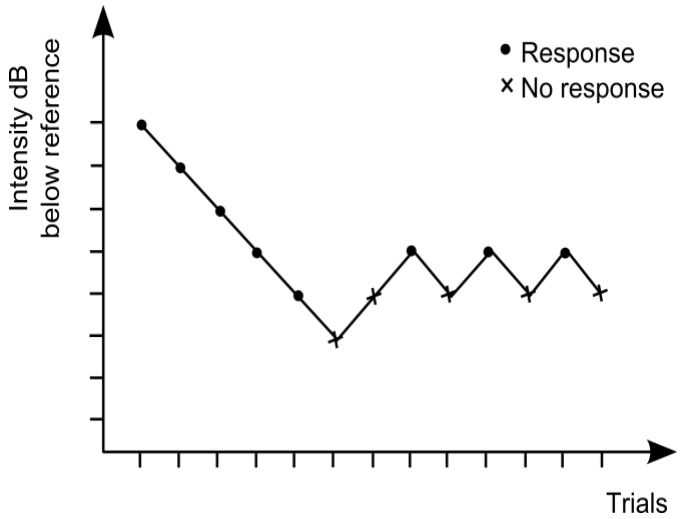

Fig. S2. Example data for a typical sensitivity threshold by the staircase-method. Amplitude of the signal is reduced with every positive response (black dot), and increased when a negative response is observed (cross). This continues until there are consecutive iterations of positive-negative (shown by the last six points). An average of ten iterations is used to calculate the threshold of response, after Cornsweet (1962)

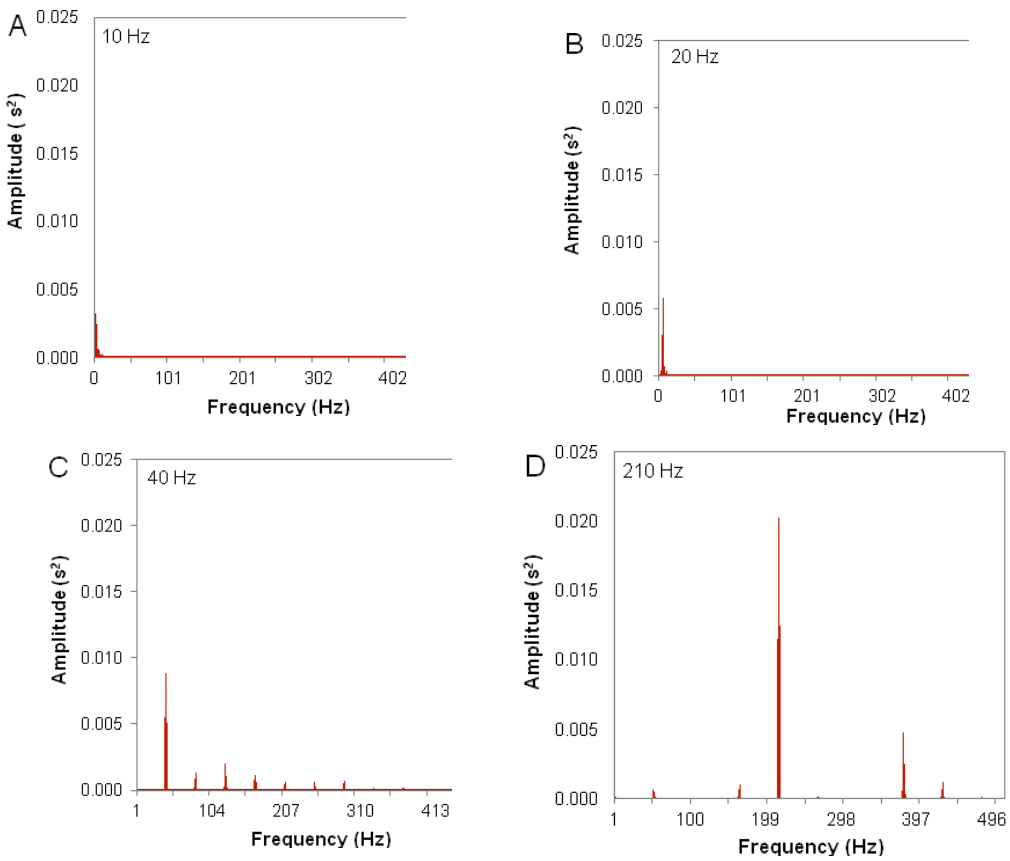

Fig. S3. Example spectra of measured shaker signals. 10 Hz (A), 20 Hz (B), 40 Hz (C) with small resonant peaks, 210 Hz (D)

Supplemental text

The statocyst system (internal) in invertebrates

The structure of the statocyst, whilst varying between invertebrate species, typically consists of a dense mass known as the statolith or multiple smaller statoconia, in a chamber lined by sensory hair cells (Budelmann 1988). In a similar way to the statocyst in fish, a vibrational stimuli sets the whole body in motion, but the more dense statolith moves at a different rate. The motion of the mass inside the chamber causes deflection of the sensory hair cells and elicits a sensory response. The statocyst system is well described in cephalopod molluscs (Budelmann 1979, 1985, Williamson & Budelmann 1985a, Williamson & Budelmann 1985b, Hanlon & Budelmann 1987, Budelmann 1992, Budelmann & Williamson 1994, Neumeister & Budelmann 1997), but there are few data available for *M. edulis* although the system has been described in other bivalve molluscs (Cragg & Nott 1977, Budelmann 1992, Zhadan 2005).

The superficial receptor system (external)

The external system, or the superficial receptor system, consists of chemoreceptors and mechanoreceptors (Olivo 1970, LaCourse & Northrop 1978). Epidermal sensory cells may be moved by local hydrodynamic changes, and therefore may be involved with detection of hydrodynamic and vibrational stimuli in a similar way as the cephalopod epidermal head cells, or the fish lateral line (Budelmann & Bleckmann 1988, Bleckmann et al. 1991, Budelmann et al. 1991). These receptors may be stimulated by the movement of cilia cells on the mantle and other receptors on the body surface and appendages (Cragg & Nott 1977, Charles 1980, Zhadan 2005) and in some cases may involve specialised abdominal sense organs (Zhadan 2005), see also Budelmann (1988). However there are few data available on this system in bivalves, see Budelmann (1992), although responses to water movements have been observed (Frings & Frings 1967).

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