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Ultrasound noise in animal holding rooms with IVC ventilation towers; does it affect breeding performance?

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It is well known that noise (and noise induced vibrations) can cause stress in animals. The effect of stress from noise and vibrations in animal models can impact and interfere with research outcomes in nearly every area of biomedical research. Also breeding performance may be influenced.

Experimental set-up

In order to find a cause of poor breeding performance sound data was collected over two weeks in the month of July 2016. For this purpose a NC*MX-HD NEUTRIK microphone and Avisoft UltraSoundGate was used, connected to a laptop, and analysed by Avisoft RECORDER software. The data was collected in four different periods, i.e. morning, noon, afternoon and evening, three days a week, at 14 different locations in 3 animal holding rooms.

Results

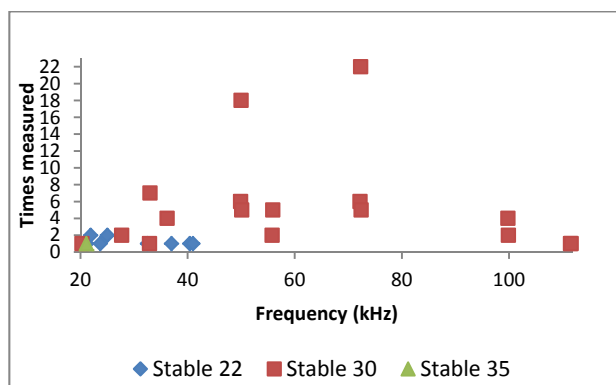


Figure 1: Number of measure for the frequencies. The x-axis is the frequency (kHz), the y-axis is the counted number of how often the respective frequencies was measured during the sampling period.

Ultrasound was found in stable 22, mainly in the range between 21 kHz and 25 kHz, with single measures at 32.5, 37, 40.4 and 41 kHz, and stable 30, with high occurrences at frequencies of 33.7 50 55.9 72.3 and 99.8 kHz (Figure 1).

At 50 and 72.3 kHz a sound pressure peaked over 60 dB (Figure 2), in the location close to the IVC ventilation tower. Locations further removed from the ventilation tower did not show ultrasound noise. No clear indications of ultrasound were found in stable 35.

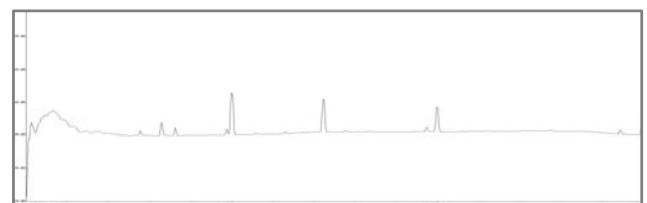


Figure 2: Power Spectrum in stable 30, close to the ventilation tower, showing the relation between frequency (kHz) and sound pressure (dB). Peaks can be observed at 33.7, 50, 55.9, 72.3 and 99.8 kHz.

Discussion

Ultra sound noise was generated by an IVC ventilation tower, but the noise could only be observed close to the ventilation tower. Frequencies peaked at 50 and 72.3 kHz at sound pressures of over 60 dB. However since no ultrasound noise was found further away from the ventilation tower, and only in one animal holding room, ultrasound noise generated by ventilation towers cannot be the cause of poor breeding performance.

The production of ultrasound is typically caused by worn bearings, and even though ultrasound cannot be detected further away from the ventilation tower, it is recommended to service IVC ventilation towers placed in animal holding rooms regularly, in order to avoid ultrasound generation.