

NOISE IN THE ANIMAL HOUSING ENVIRONMENT

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SUMMARY

Noise produced in intensive animal rearing by ventilation system, feeding and excrement removal lines and by animals themselves is a potential stressor and affects not only animals but also the tending personnel. High sensitivity to noise levels has been observed in pigs with some potential impact on their behaviour. In our study we measured exposure of pigs to noise in 3 houses for three categories of pigs, farrowing house, house for weanlings and house for sows before mating and after confirmation of gravidity. Although our measurements failed to identify high exposure of pigs to noise, this issue should be monitored further to avoid unnecessary stress in this very sensitive species of animals.

Keywords: noise, pig housing

INTRODUCTION

With the widespread use of intensive rearing systems, animals are increasingly exposed to several stressful situations engendered by farm management practices. Handling of animals, confined housing conditions or social stress in group housing are strong stressors throughout the life of farm animals causing acute or chronic activation of the hypothalamo-pituitary-adrenocortical (HPA) axis and the sympatho-adrenomedullary (SAM) system (Otten et al., 2004).

Noise is a potential environmental stressor and has also been identified as an aversive stimulus during animal housing. Animals are exposed to greater noise by the mechanization of many husbandry procedures. The noise produced in animal production affects the tending personnel and veterinarians and may even lead to damaged hearing (Jackson 2002). The damage to hearing is insidious in its nature because it occurs over some time and when the levels are sufficiently high this damage can be irreversible. The damage occurs when the hair like cells (cilia) that receive the sound waves are repeatedly or very violently flattened. Initially, given enough quiet time for regeneration, the damage may be reversible. Because of that the maximum noise level allowable over an eight hour period is 85 dB. Longer exposure to higher levels may result in damage.

There are contrasting reports regarding the influence noise may have on the physiological, behavioural and productive traits of animals, especially because response to sound stimulation are species-specific and largely depend on the nature, loudness and familiarity of the noise.

The exposure of farm animals to noise has been identified as a potential stressor not only in housing (Talling et al., 1998a; Schäffer et al., 2001) but also during the transport and at the abattoir (Geverink et al., 1998). Noise experienced during housing of farm animals can be short-term and acute (e.g. screaming before feeding times) or uniform and chronic or chronic intermittent (e.g. basal sound levels caused by crowded animals, mechanical ventilation). Average

sound pressure levels ranging between 69 and 78 dB were recorded in fattening units of pig farms, between 88 and 96 dB during transport and between 85 and 97 dB at the abattoir (Talling et al., 1998a). Behaviour of piglets and sows during suckling in relation to sound levels were investigated by Bo Algiers et al. (1985). The external noise changed the vocalisation feeding pattern so that the noise-exposed piglets gained less milk and their weight gains were affected.

Our study was aimed at measurement of noise level on a pig farm in houses for different categories of pigs.

MATERIAL AND METHODS

Measurements were carried out on a pig farm in the house for weanlings, farrowing house and house for sows before mating and farrowing sows. In the farrowing house the conventional way of housing with some bedding was used with area of pens divided to the part only for sow and that available only to piglets which prevents sows to overlay the piglets. The weaned piglets were housed in group pens with automatic *ad libitum* feeding and partly solid, partly perforated floor. Sows before mating and confirmation of gravidity were housed individually and gravid sows were on deep litter. They were both in one house.

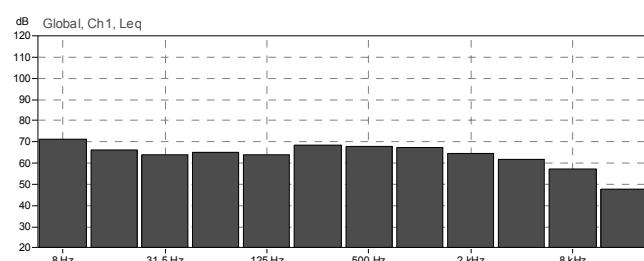
The measurements were carried out with an integrated noise measurement apparatus NORSONIC 118, accuracy class 1, with 1/1 frequency analysis.

RESULTS AND DISCUSSION

Results obtained in our study are presented in Fig.1. – 3. and Tables 1 – 3.

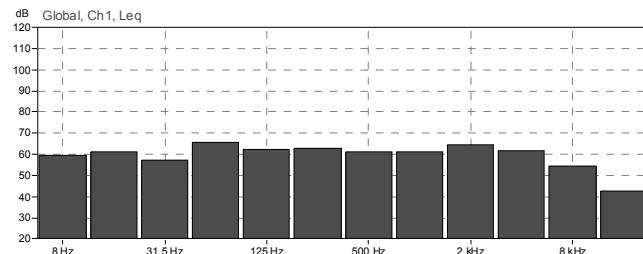
Weanlings (from 5–7 to 30–35 kg b.w.)

| | Leq (dB) | Lpeak (dB) |
|---------|----------------|-----------------|
| A | 72.1 dB | 107.3 dB |
| C | 74.8 dB | 107.0 dB |
| FRQ | | |
| 8 Hz | 71.0 dB | |
| 16 Hz | 66.2 dB | |
| 31.5 Hz | 64.1 dB | |
| 63 Hz | 65.0 dB | |
| 125 Hz | 63.8 dB | |
| 250 Hz | 68.3 dB | |
| 500 Hz | 67.9 dB | |
| 1 kHz | 67.6 dB | |
| 2 kHz | 64.7 dB | |
| 4 kHz | 61.9 dB | |
| 8 kHz | 57.5 dB | |
| 16 kHz | 47.7 dB | |



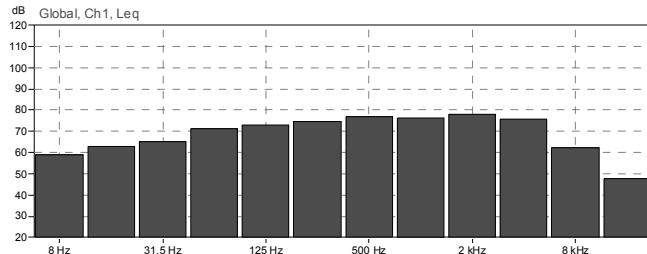
Farrowing house

| | Leq (dB) | Lpeak (dB) |
|---------|----------------|-----------------|
| A | 69.1 dB | 101.5 dB |
| C | 71.5 dB | 100.7 dB |
| FRQ | | |
| 8 Hz | 59.4 dB | |
| 16 Hz | 61.0 dB | |
| 31.5 Hz | 57.5 dB | |
| 63 Hz | 65.9 dB | |
| 125 Hz | 62.4 dB | |
| 250 Hz | 62.9 dB | |
| 500 Hz | 61.0 dB | |
| 1 kHz | 61.4 dB | |
| 2 kHz | 64.3 dB | |
| 4 kHz | 61.7 dB | |
| 8 kHz | 54.5 dB | |
| 16 kHz | 42.7 dB | |



Sows before mating and gravid sows

| | Leq (dB) | Lpeak (dB) |
|---------|----------------|-----------------|
| A | 83.1 dB | 113.8 dB |
| C | 83.9 dB | 114.9 dB |
| FRQ | | |
| 8 Hz | 59.2 dB | |
| 16 Hz | 62.7 dB | |
| 31.5 Hz | 65.2 dB | |
| 63 Hz | 71.3 dB | |
| 125 Hz | 72.9 dB | |
| 250 Hz | 74.5 dB | |
| 500 Hz | 76.8 dB | |
| 1 kHz | 76.4 dB | |
| 2 kHz | 78.0 dB | |
| 4 kHz | 75.5 dB | |
| 8 kHz | 62.2 dB | |
| 16 kHz | 47.5 dB | |



Effects of acute and chronic noise exposure on the behaviour as well as on the neuroendocrine and immune system were observed in different species (Segal et al., 1989; Raaij et al., 1996). Very little information is available about acute or chronic noise effects on pigs. Acute sound exposure was found to increase active behaviour and heart rate (Talling et al., 1998b). A single and short-term noise exposure of pigs at 120 dB was found to increase plasma glucocorticoid concentrations, but had no effect on plasma catecholamines (Kemper et al., 1976).

The sources of harmful noise in animal production are various: feeding 104–115 dB, mating 94–115 dB, high-pressure cleaning 105 dB, feed mixing 88–93 dB. However, these values are only orientational and may differ according to the technologies used. There are respective regulations which set the minimum requirements on protection of herds for individual categories

of animals. For pigs, which are very sensitive to changes in noise levels, these requirements are specified by the Statutory Order of SR No. 325/2003 that amends and supplements the Statutory Order of SR No. 735/2002 of the Civil Code specifying minimum standards for protection of pigs. In the part of a building where pigs are reared the noise level must not exceed 85 dB and there are also limits on background or sudden noise.

Different levels of noise were observed in pigs in relation to the type of ventilation. The sound level measured in mechanically ventilated pig buildings was 73 db but naturally ventilated buildings were on average 10 dB quieter. The frequency of sound on farms is also important and ranges between 20 to 6 300 Hz.

Our results did not indicate high exposure to noise of pigs in different houses for individual categories. However, with regard to the fact that even short-lasting but intensive noise can have harmful effect not only on animals but also on personnel this issue requires further monitoring and attention.

CONCLUSION

The noise issue in agriculture has recently attracted considerable attention with regard to both animal well-being and working conditions of animal tenders. High sensitivity to noise levels has been observed in pigs with some potential impact on their behaviour. Some sources of noise (ventilation system) result in almost constant exposure while others can produce short-lasting but intensive noise (feeding and manure removal lines). Although our measurements failed to identify high exposure to noise of pigs, this issue should be monitored further to avoid unnecessary stress in this very sensitive species of animals.

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