

20 ■ Noise in pig housings

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Noise may be a potential stressor in intensive animal rearing because of high number of noise-producing animals, needs for more intensive ventilation system and feeding and excrement removal lines. All this may result in relatively high level of noise that 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.

Key words: noise, pig housing

Introduction

Animals in intensive rearing systems, are increasingly exposed to various stressful situations arising from animal rearing 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 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.

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

Farm animals are exposed to noise not only in housings (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 Algers 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. The aim of our study was to measure and evaluate the noise level on two different farms in houses for fattening pigs.

Material and methods

Measurements were carried out on 2 typical farms for fattening pigs with ad libitum feeding by dry mixed feed. Pigs were housed in pens without litter. Air exchange in the houses was ensured by forced ventilation system. The measurements were carried out with an integrated noise measurement apparatus NORSONIC 118, accuracy class 1, with 1/3 frequency analysis.

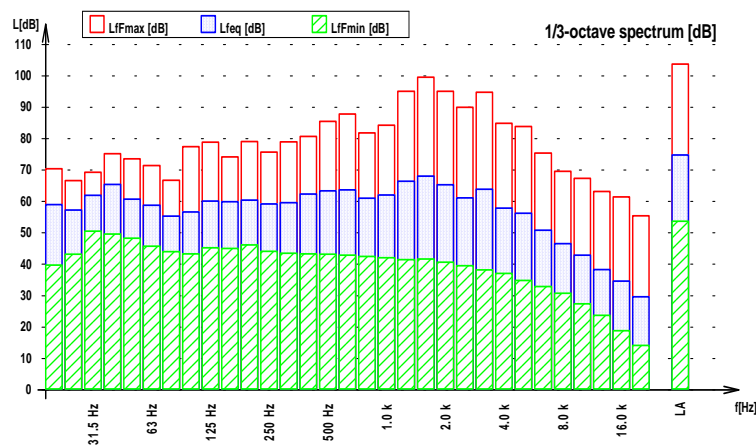
Results and discussion

Results obtained in our study are presented in Fig.1. – 4.and Tables 1 – 2.

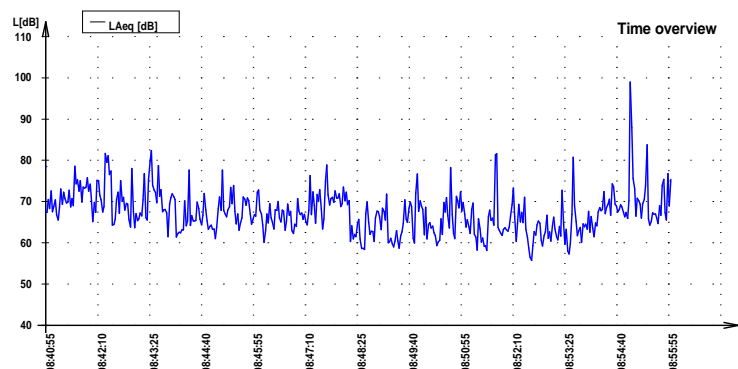
**Table 5 – Pig farm 1
Noise level**

Parameter	Level [dB]	Parameter	Level [dB]	Percentile	Level [dB]
LAeq	74,8	LCeq	75,8	L 0,1	98,8
LAFmax	103,7	LCFmax	102,6	L 1	82,6
LAFmin	53,7	LCpeak	113,4	L 5	76,0
				L 10	73,4
				L 50	65,4
				L 90	59,7
				L 95	58,3
				L 99	56,2

**Figure 8 – Pig farm 1
1/3 octave spectrum (dB)**



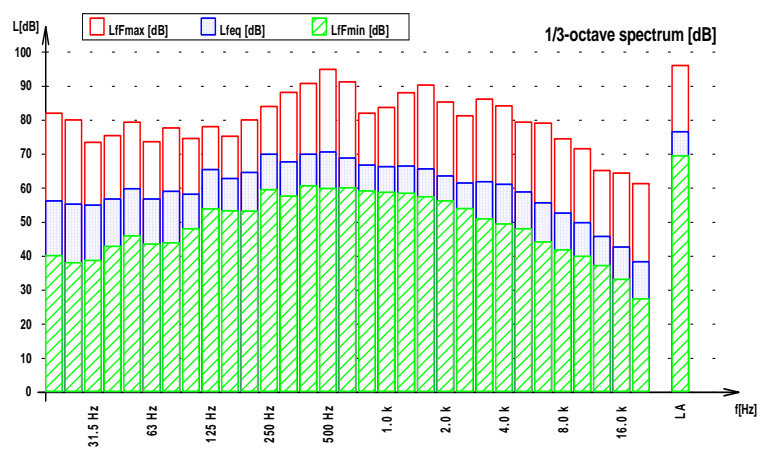
**Figure 2 – Pig farm 1
Time overview**



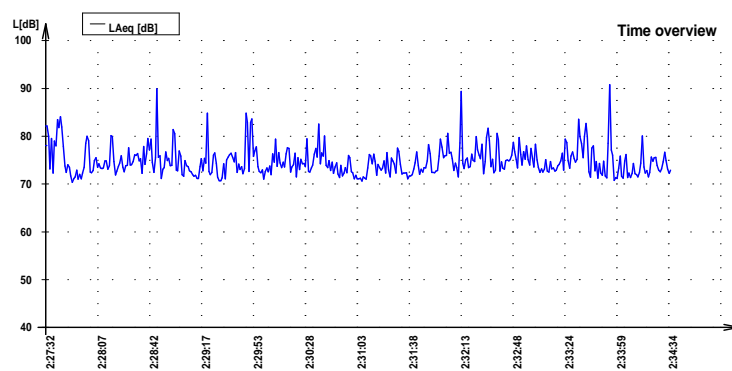
**Table 2 – Pig farm 2
Noise level**

Parameter	Level [dB]	Parameter	Level [dB]	Percentile	Level [dB]
L _{Aeq}	76,5	L _{Ceq}	79,1	L 0,1	94,2
L _{AFmax}	96,0	L _{CFmax}	98,6	L 1	85,6
L _{AFmin}	69,5	L _{Cpeak}	112,4	L 5	80,8
				L 10	78,6
				L 50	73,6
				L 90	71,4
				L 95	71,0
				L 99	70,4

**Figure 3 – Pig farm 2
1/3 octave spectrum (dB)**



**Figure 4 – Pig farm 2
Time overview**



Different species were observed for the effects of acute and chronic noise exposure on the behaviour as well as on the neuroendocrine and immune system (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).

Harmful noise in animal production originates from various sources: 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.

Various 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 6300 Hz.

Our results did not indicate high exposure to noise of fattening pigs on two observed farms. 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 further monitoring of its level is justified.

Conclusion

Noise in intensive animal houses 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).

In the examined pig houses we did not measure such a high levels as reported by some authors for ad libitum fed pigs. Although we detected high levels of L_{peak} , the equivalent levels obtained by long-term measurements did not exceed the limit $L_{Aeq} = 85$ dB.

Acknowledgement: The study was supported by the Project VEGA 1/4390/07

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