

# As good as it sounds: understanding piggish

Based initially on the knowledge of animal keepers, a pioneer research in Brazil is starting to unravel some of the secrets of pig vocalisations. The study showed a complex interplay between nursing and vocalisations of piglets and sows, but found no relation between temperature and the level of animal noise at nurseries.

By Rogério G. T. da Cunha

It all started with a search for alternative methods to assess animal welfare, a growing concern all over the world. Dr Késia Oliveira da Silva, a researcher from the Nucleus of Research on Ambience (NUPEA) at the Superior School of Agriculture 'Luiz de Queiroz' at the University of São Paulo, Brazil, explains that evaluation of well-being was mostly done through overt behaviour and focused mainly on thermal stress.

For a couple of reasons, she was searching for an alternative approach, both in methodology and also in focus. Direct visual observation is time-consuming and demands specialised personnel; moreover, the use of cameras does not solve any of these problems and creates additional ones (insufficient coverage for example).

Dr Irenilza de Alencar Nääs, a researcher from the University of Campinas stresses that sound is being increasingly studied all over the world and it is becoming an important tool for welfare evaluation, since it can indicate an internal state of the animal (hunger, pain, etc.) or the occurrence of a stressing external event.



Trial nursery pen showing a microphone, hanging from the ceiling, for detecting the sound level.

Then, in conversations with animal keepers at Granja Querência, a farrow-to-finish unit located in Salto, Brazil, Silva found out that they claimed to interpret some sow and piglet sounds. From that to the establishment of a research line attempting to analyse and interpret the sounds it was a small step away.

“We started with two basic ideas. One, is the study of individual vocalisations, possible only with sows and newborns in the maternity. The other is to study the average animal noise in the nursery pens, and attempt to correlate it with environmental factors. In both cases our aim was to get sound indicators of animal states and/or housing conditions,” Silva completes.

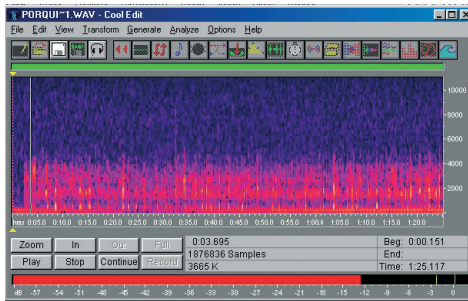
## Lunch is served

Based on the initial hints given by the keepers on the meaning of the calls, Silva selected six similar sows to study their and the piglets individual vocalisations, in their nursing interactions.

The study started soon after the homogenisation of the lots and before the contact with the sows. With a directional microphone, like those used by bird-watchers, she recorded the sounds directly into a laptop while she recorded the behaviour of the animals. Later on, the calls were analysed with the aid of a special sound-analysis software, Cool Edit®, to describe their physical parameters (frequency, amplitude, etc) and attempt to differentiate them.

Silva says that she was able to characterise four different sounds, two from the piglets and two from the sows. “The results were fascinating. Before the contact with the sows and during manipulation, the piglets produced a fear call, and the sows showed signs of anxiety. Then, when the piglets changed to a ‘hunger call’, the sows started to vocalise as well. Since this resulted in an immediate approach of the piglets, this call was baptised the ‘calling-to-nurse sound’. The sows did not stop calling until the last piglet had





Screen of the sound-analysis software, Cool Edit®, showing the hunger call. The graph shows different frequencies (pitch) along time. The more intense the colour the more important is a given frequency to the final sound. Note that this sound, which has a grunting quality, accordingly situates in a low frequency (bass) range, up to 400 Hz. All illustrations are courtesy of Dr Késia Oliveira da Silva.

arrived at a nipple. Then, she changed to a 'releasing milk sound', which lasted approximately 15 seconds. Milk was released only while she was producing such sound," Silva concludes.

After this initial study, NUPEA's intention is to expand the research in order

to analyse and characterise sounds emitted in other circumstances, such as during pain, manipulation (castration, vaccination, tail and teeth cutting), in the presence of unknown people and also different kinds of cough (to detect whooping cough for example). Their medium-term objective is to develop a software that recognises the sounds (based on their different physical properties) and interprets them to the producer, a sort of 'Piggish Translating Machine'.

"It will be a module within an already existent traceability software, and it will help the producer to obtain a wealth of information on the status and welfare of the animals in a simple and quick way, and also to check for deviations of behaviour," Silva explains.

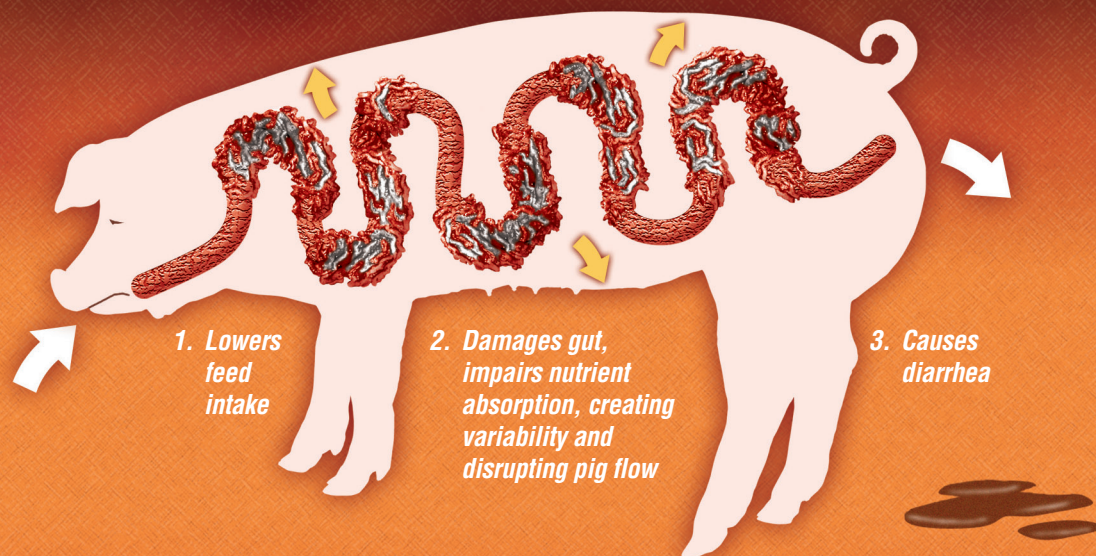
To show the utility of such results, Silva exemplifies with a situation in which a given piglet did not reach the nipple, for whatever reason. Even with only one piglet missing, the sow will not stop producing the 'calling-to-nurse

sound', and will not release the milk to the others. "Animal keepers can be trained to recognise the sounds and quickly solve situations like this, by correctly positioning the missing piglet," Silva concludes.

### The crowd is not so clear... yet

The other line of investigation is to study group noises in the collective pens, since it is virtually impossible to distinguish individual sounds in such situations. The research approach had to be different in this case. "We split a 10 x 14 m nursery pen into 35 quadrants of 4 m<sup>2</sup> each. In the middle of each quadrant we measured temperature, humidity and noise level," De Alencar Nääs explains. They measured the sound at feeding times, periods of peak noise production, but also average and minimum noise. In order to focus only on the sounds related to the animals, they measured noise level within the empty pen and subtracted these values from the noise levels

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measured at feeding times.

“Our intention was to verify if temperature and humidity interfered in the noise level, something that could be a powerful tool in evaluating environmental stress. Unfortunately we found no correlation”, she completes.

However, Alencar Nääs did come up with some interesting conclusions from the study. When they compared groups of 33- and 38-day old piglets, the younger group had higher average noise levels, but this was not statistically relevant. The younger group also had more extreme noise values.

“We interpreted these results as an indication that the newly arrived piglets (33-day old group) were less habituated to the new environment. We also observed that the most extreme values occurred at the edges of the pen, which might indicate an influence of the external environment,” Alencar Nääs concludes.

Although the results were not as positive as in the previous case, this

approach opened an interesting avenue of exploration. They are now attempting to correlate the average noise in the barn (an indicator of the stress levels of the animals) to the occurrence of intermittent sounds, intentionally produced by the researchers. In parallel, they are also studying the reaction of individual sows and piglets to these sounds, which could allow a characterisation of specific sounds. The whole idea is to check the reaction of the animals to a potential and common stress factor within producing units, which could lead to the suggestion of preventive measures.

Silva is also investigating sounds the other way round, that is, if the noise level at the barns and pens causes premature deafness in sows. Her team and the animal keepers noticed a higher loss of crushed piglets as the sows age. Therefore it seems likely that some older sows do not answer appropriately to the fear and pain calls of the piglets when they sit or lie on them, simply

because they do not hear the calls. “If we discover a correlation between noise level at the unit and deafness, measures could be suggested to producers in order to avoid that, which would lead to a lower piglet mortality,” Silva concludes.

**Promising study**

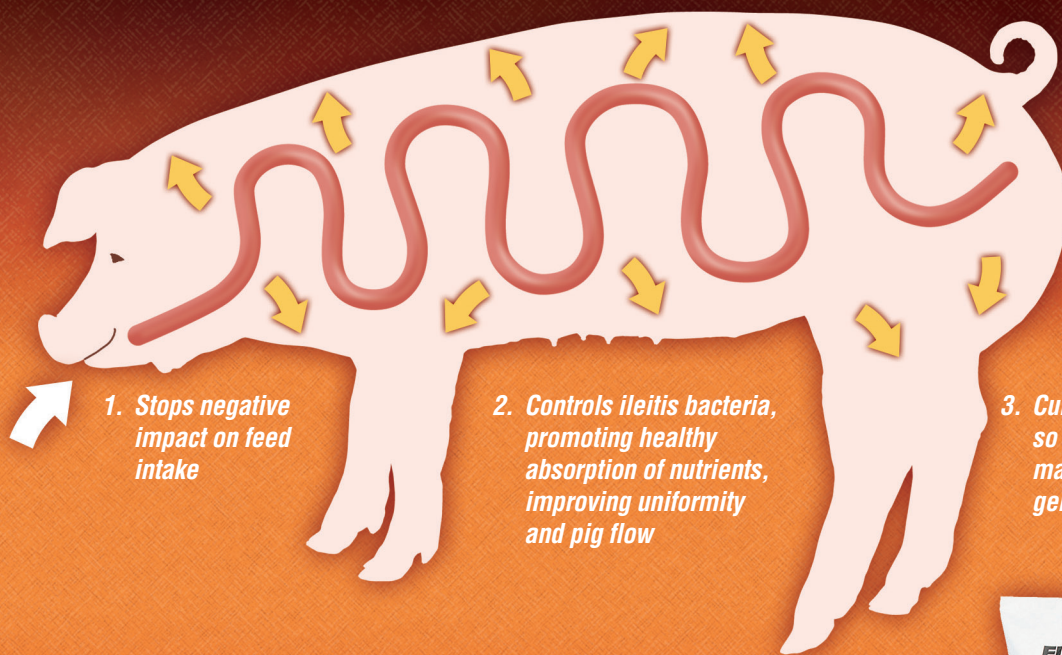
Given that other livestock animals and many wild species have already been studied with respect to their sounds, some intensively so, it is surprising to find out how little we know about pig vocalisations. Equally astonishing is that it took so long to realise that the sounds could be a simple and powerful indicator of animal condition, emotional state and welfare condition. But thanks to the research, this situation already started to change.

Soon, we may be understanding pig-gish, to their and our benefit. **PP**



Decibel-level meter used in the group noise research

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