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Pigs' Environmental Requirements and the Principles in fulfilling them

Pig production is influenced negatively by flaws in the environment. Flaws may be expressed as stress. The total stress occurs as a result of several factors, the climate in the pen being one of the important ones. Pigs in pens live far from their natural habitat and it is the job of the producer to meet as many of the pigs' natural needs as possible. It seems to take time for a high stress level to affect production, but when it finally does, a large reduction of the stress level is necessary in order to remove the production problems again. Apart from the environment, important stress factors are stocking density, pen layout, feed and feeding methods, genetics and group size. The factors affecting the environment may be listed in the following manner.

Temperature

Pigs are reasonably tolerant with regard to temperature. If it is too cold they will not grow, but they can compensate by huddling together. At very low temperatures, their feed consumption will increase. If it is too warm, they will attempt to cool off by making themselves wet. They will therefore lie in the manure zone (turn round in the pen) in order to keep wet. This increases the stress level in the pen, although a wet and dirty pig does not





necessarily mean lower production. Piglets need higher temperatures than large pigs. Pigs with large feed rations need lower temperatures.

Air quality

Good air has a low content of primarily ammonia, dust and odour. Since pigs are closely packed, there is an increased danger of infection. It is therefore important that pigs have a strong resistance to infection. Ammonia irritates the lungs and makes it easier for bacteria and virus to infect them. Dust contains proteins which also irritate, and which themselves can bear virus or bacteria, especially if the air is very damp. Normally the ammonia content must be under 25 ppm, dust 3-5 mg/m³ air. Carbon Dioxide (CO²) is not dangerous in itself, but it is an indicator of a high content of the other substances. At minimum ventilation, CO² must not exceed 2500-3000 ppm (0.25 % - 0.3 %).

Air velocity

Pigs' perception of temperature is very dependant upon the air velocity in the pen. Without any ventilation effect the velocity is about 0.25-0.30 m/s, but if the velocity is increased to 0.5 m/s, the pigs will feel a chill of 3-5 degrees. It is therefore important that the air velocity in the pen is not affected at minimum ventilation, whereas an increase at maximum ventilation is required.

Air humidity

Air humidity is not especially important in pig

production. However, piglets must not be exposed to humidities below 40-50 %, as they begin to cough as a sign of irritation. Very high humidities increase the infection pressure as well as the load on the building (condensation).

Homogeneity

All pens must have the same values for the above properties. If not, it is not possible to solve problems arising in some pens without other problems arising in other pens.

Light

Pigs are only slightly sensitive to light, but in some situations it can be the straw that breaks the camel's back. Pigs are like people in many ways. They prefer cleanliness; want to sleep undisturbed in a warm and comfortable place, preferably with the lights dimmed. During active periods they prefer the environment to be well lit and cool. There is one major difference, though. The manure area must be wet, cold and preferably well lit. Too much light in the resting area increases the stress level.

Safety

If technical installations fail, there must be an emergency system, which will provide the pigs with tolerable conditions until the fault is found and repaired. Permanent damage or deaths cannot be accepted.





Principles of fulfilling the pigs' environmental requirements

Temperature

As the pigs consume feed, they produce excess heat. This heat is used to heat the house. If there is more heat than necessary, the ventilation is increased, and the excess heat is removed. Increased ventilation will also increase the air speed, and therefore the temperature in the house will increase slowly in proportion to the ventilation.

Air quality

The slurry and manure produced by pigs give off gases to the surrounding air. If there is too little ventilation, the gas level in the house becomes too high. Therefore, ventilation must be increased. One can choose to allow the temperature to drop in order to be able to ventilate more (min. ventilation or Comfort min.) or to supply heat, by which means ventilation can be increased while the temperature is maintained (humid heat). Avoid ventilating the slurry room. Partition walls may be necessary in the slurry room. Ammonia is damaging to pigs. If more ammonia than normal is produced in the house, there will be higher concentrations in the air. Increased ammonia production is evident if the pens are wet or the pH value of the slurry is high (above 7.5). A high slurry level (warm slurry), ventilation of the slurry room, and excess protein in the feed are important factors. Under normal circumstances the ammonia level is 3-10 ppm in houses with partial slats and 10-20 ppm in houses with full slats.

Air velocity

Air velocity is affected by differences in heat within the houses, as well as differences in stocking density, leaks, and the introduction of fresh air. Uneven stocking densities and major leaks must be avoided. Fresh air must be introduced as slowly as possible while avoiding cold air pockets. External

influences must be suitably low. The location of the fresh air intake units is important, and the necessary space for mixing is important.

Air humidity

The air humidity can only be controlled if the low ventilation area is ventilated. If the air is too damp, hot air can be supplied in order to increase ventilation and decrease the air humidity. Problems with too low air humidity may be solved by lowering the minimum ventilation, or if this cannot be done because of air quality considerations, by lowering the temperature. Alternatively, water can be introduced (humidification).

Homogeneity

Homogeneity is obtained by ensuring that air jets have the correct force and direction, so that return air is generated throughout the width of the house. Powerful interlinking along the length of the house ensures that all inlets open evenly.

Light

Avoid too many windows and light-coloured walls. If additional light dimming is required, use light dimming in- and outtakes.

Safety

Use ventilation principles with built-in natural safety. Use natural lift. Alarms and emergency opening equipment are an important factor.