

How housing can impact the reproductive performances in boars and sows

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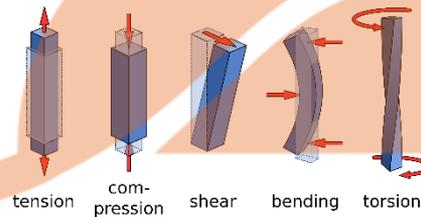


Understanding Stress

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What is it?

Physical - pressure or tension exerted on a material object



Mental - a state of worry or mental tension caused by a difficult situation



What is it?

In behavioral sciences stress is regarded as the perception of threat, with resulting anxiety, discomfort, emotional tension, and difficulty in adjustment

For Neuroendocrinology (which is the interaction between the nervous and endocrine systems), stress is any stimulus that provokes release of the adrenocorticotrophic hormone (ACTH) and adrenal glucocorticoids

To sociologists, it is any social disequilibrium that produces disturbances in the social structure within which a population lives

*

Fink G. Stress: definition and history. In: Squire LR, editor. *Encyclopedia of Neuroscience*. London: Elsevier; 2009. pp. 549–55.

What is it?

Events or things that cause a negative reaction, either physically, behaviorally, or chemically

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Signs of Stress

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Behavioural:

Interaction with other animals

Eating/Drinking

Excess noise

Disruption of biorhythm and circadian patterns

Physical:

Movement (sore feet, stiff joints)

Position of ears and head

Breathing (panting)

Blotchy skin

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Effects of Stress on Production

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Boars:

Negative effect on semen production and sperm maturation

Sows:

Cortisol (ACTH or stress hormone) has a negative effect on oestrus and ovulation

Both:

Increased mortality

Feed refusal

Increased aggression

Identifying Stressors

(and how to remove them)

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Temperature:

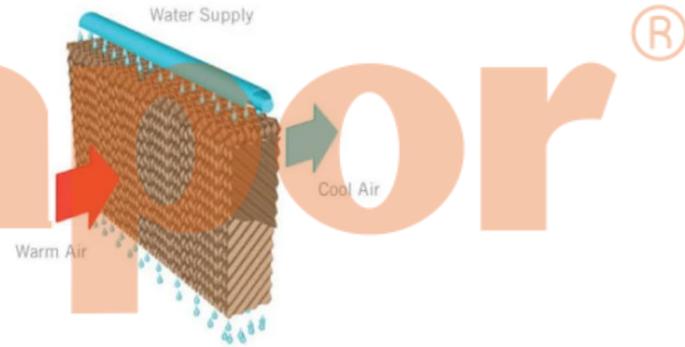
Reduced capacity to sweat

Increased panting to thermoregulate

Thermoneutral zone – 14.5°C – 34°C

Cooling methods: Indirect

Evaporative cooling



Air conditioning



Cooling methods: Direct

- Cooling is actually removing heat
- Pigs lay down 80% of the time
- Cooling pads are being developed

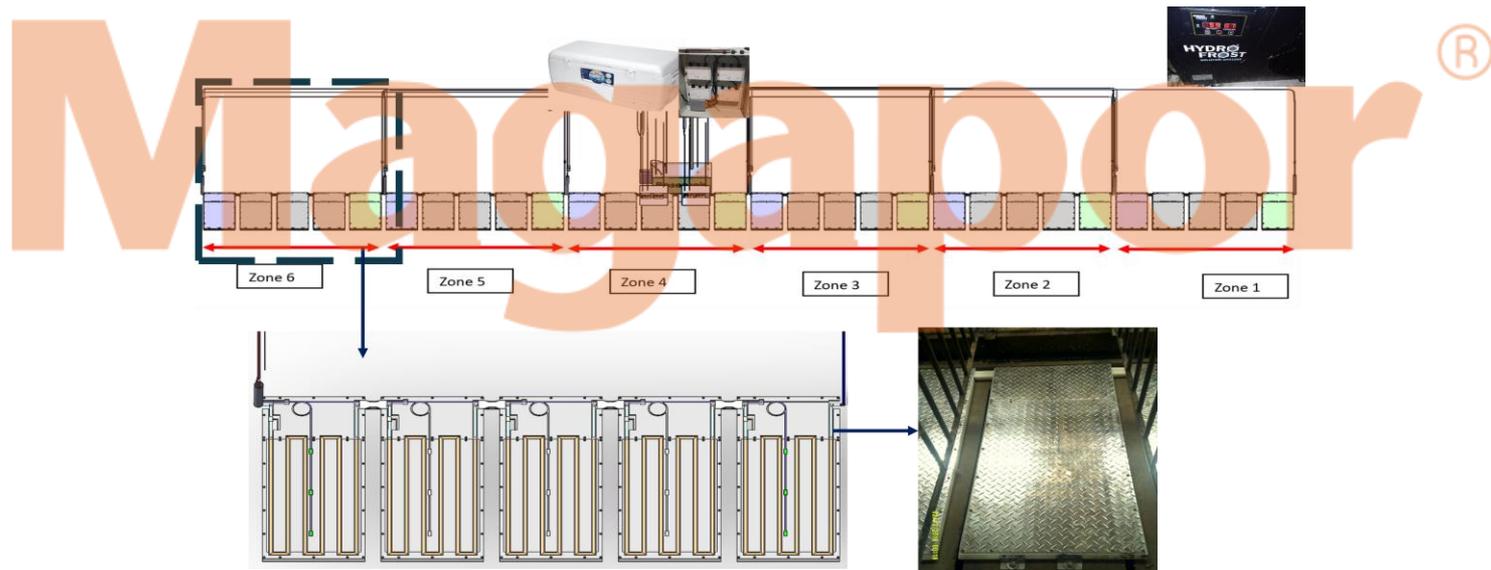
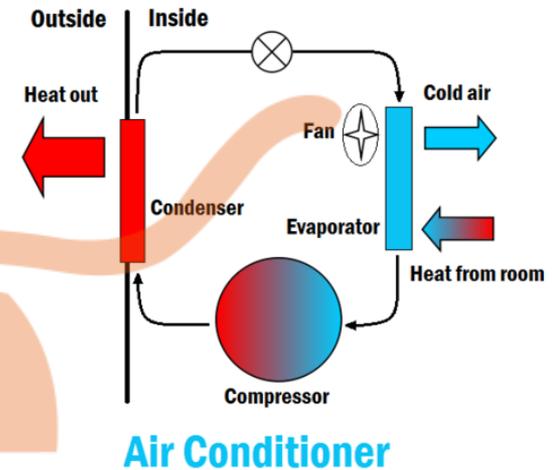


Fig 8. Diagram series of the electronically controlled grouped cooling pad

Housing design:

Proper floor (foot health and comfort)

Physical damage to “key areas”

-sharp edges, worn penning/equipment

Reduced handling (plan movements)

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Temperature:

Same as boars

Reduced capacity to sweat

Increased panting to thermoregulate

Thermoneutral zone – 13°C – 31°C (slightly cooler than boars)

Cooling methods:

Indirect (Evaporative cooling)

Direct (Drip Cooling in stalls/crates)

Floor Cooling Pads

Increase in feed intake, improved milk production, recalibrated circadian rhythm, increased melatonin production

Farrowing – a tale of two temp zones:

- Sows want cooler than piglets
- Free farrowing considerations
 - Cannot use drip cooling (sow no longer contained)
 - Indirect cooling counter productive
 - Direct and targeted cooling/heating required



Housing design – Group housing:

➤ Feeding method – most important

- production is directly linked to condition
- sows are never fed what they want, particularly after weaning
- feed in a protected area
- better to have one full meal a day than snacks
- speed at which feed is dispensed is important
- inclusion of water dosing
- goal is to increase satiety after eating

*take away the concern for feed and all other stress factors are easier to handle

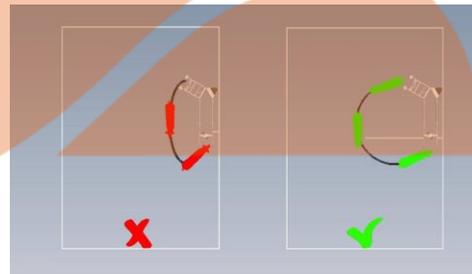


Housing design – Group housing:

➤ Pen layout

- allow for fights, but design for minimal aggression

Small Static



Large Static or Dynamic



Housing design – Group housing summary:

➤ Goals:

Feed properly

- feed at a controlled rate in a protected area
- allow time for digestion to begin and satiety to start (15-20 minutes)

Design for reduced aggression

- prevent sows that have eaten from disturbing or interacting with ones who have not
- provide large spaces or visual blocks to end fights (10 meter or a corner)
- design for familial units to exist together

➤ Improvement of all production KPI's

total born

born alive

birth and weaning weights

overall better production (increase of 1+ p/s/y)

Often overlooked:

Environmental conditions where the pigs live (not your head)

Water quality

Lighting

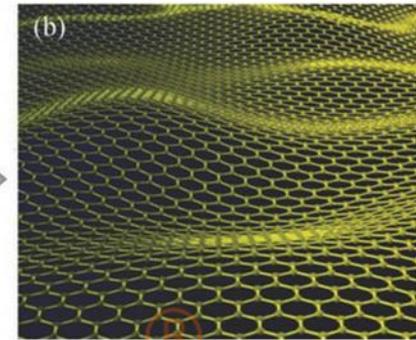
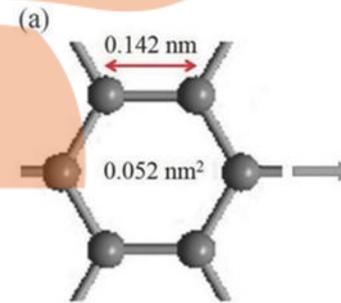
intensity (light level)
timed for regular exposure
flicker rate (quality)
shadows/evenness

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➤ New heating/cooling technologies

➤ Graphene:

- Thinnest material known to man - one atom thick
- First isolated in 2004
- 200 times stronger than steel
- Excellent conductor of heat and electricity
- High elasticity and flexibility
- Antibacterial



➤ AI for all

- Cameras and Next-Gen Tags (location, movements, temperature, etc)
 - Design of barns controlled by pigs and not by worker input
- Behavioral Monitoring Tool for Pig Farmers: Ear Tag Sensors, Machine Intelligence, and Technology Adoption Roadmap
 - Authors: Santosh Pandey, Upender Kalwa, Taejoon Kong, Baoqing Guo, Phillip C. Gauger, David J. Peters and Kyoung-Jin Yoon

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THANKS
GRACIAS

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