Alternative options for measuring the body temperature of pigs in order to relieve stress and reduce environmental impact

Dávid Köteles[1]- Violetta Tóth[1] - Wissem Baccouri[1] - Róbert Gáspár[2] - Edit Mikó[1]

[1]Affiliation: University of Szeged Faculty of Agriculture, Address – H-6800, Hódmezővásárhely, Andrássy street 15., Hungary

[2]Affiliation: Department of Pharmacology and Pharmacotherapy, Albert Szent-Györgyi Medical School, University of Szeged, H-6720 Szeged, Dom ter 12, Hungary

Introduction

Continuous monitoring of the sow's body temperature in the farrowing pen is still a major concern. [4] Pigs require a somewhat steady body temperature for critical and productive functions [1]. Maintaining sow health is critical not just for profit and performance, but also for animal welfare. Fever is one of the first and most noticeable clinical signs of several conditions, including mastitis. Rectal temperature testing in a sow takes roughly 15 seconds on average. As a result, the non-contact method saves time while also decreasing animal discomfort [4] Infrared thermography (IRT) is a potential method for autonomous surveillance of pigs for health screening, as it can be used to quickly evaluate pig health. [5]

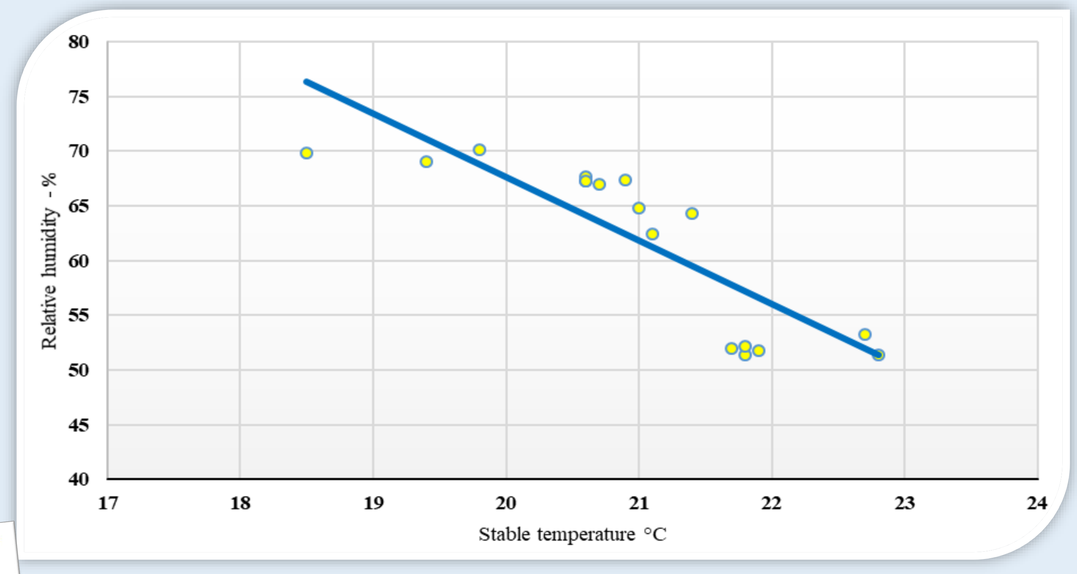
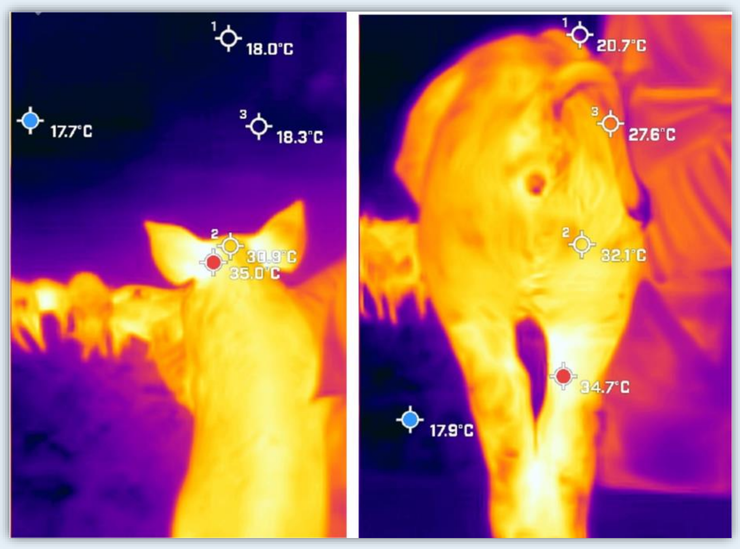


Figure 1. *The relationship between room temperature and humidity.*

Material and method

The tests began in September 2022 on a modern industrial pig farm. They work with approximately 1,500 suckling sows and 550 breeding sows, all of which have Danish genetics. The plant's production is capable of producing 90,000 fattening animals per 1 year. We recorded the parameters of 17 suckling sows, which carry a Danish hard finisher in the F1 progeny of Danish yorkshire x Danish landrace. Preliminary tests were carried out on another 15 pigs of different sexes and age groups (from 2 months to 3 years) with similar basic breeds on a small pig farm with traditional technology. During the study, 15 different parameters were examined, of which the following were used: rectal temperature, external temperature of the labia, ear temperature, humidity, room temperature, external temperature and groin temperature. The laser thermometer, the thermal camera, the analog thermometer, and the atmospheric thermometer were calibrated in the preliminary tests. The highest temperature points of the pig's skin were determined with a thermal camera, and after comparing several measuring devices with the same function, we continued to work with the most accurate one. To analyze the data, we used the SPSS statistical program with a multifactor analysis method.



Picture 1. Detection of the hottest points on the pig's skin (my recording with a Flir one pro thermal camera

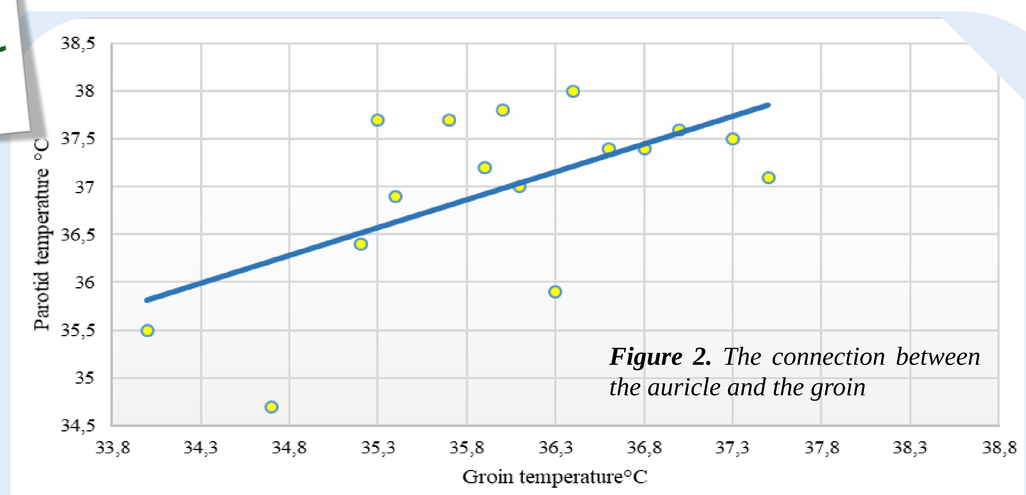


Figure 2. *The connection between the auricle and the groin*

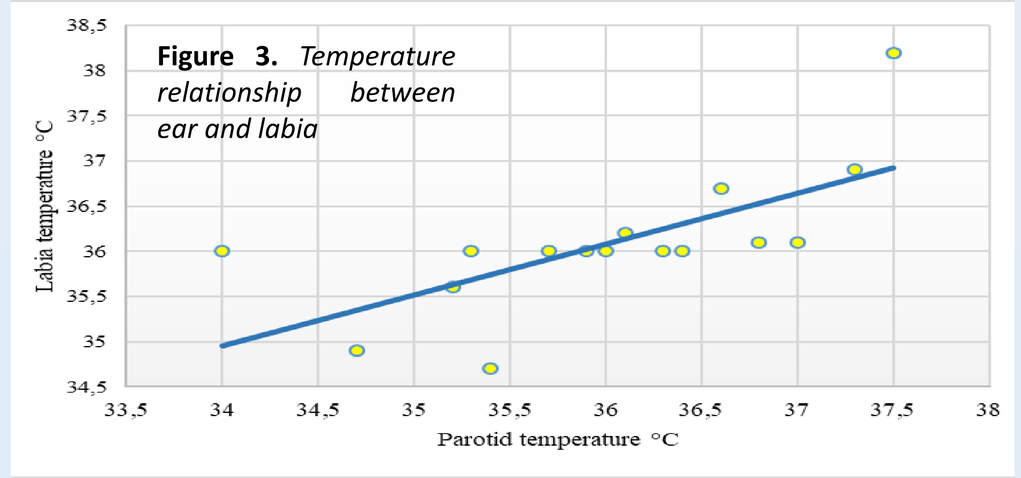


Figure 3. *Temperature relationship between ear and labia*

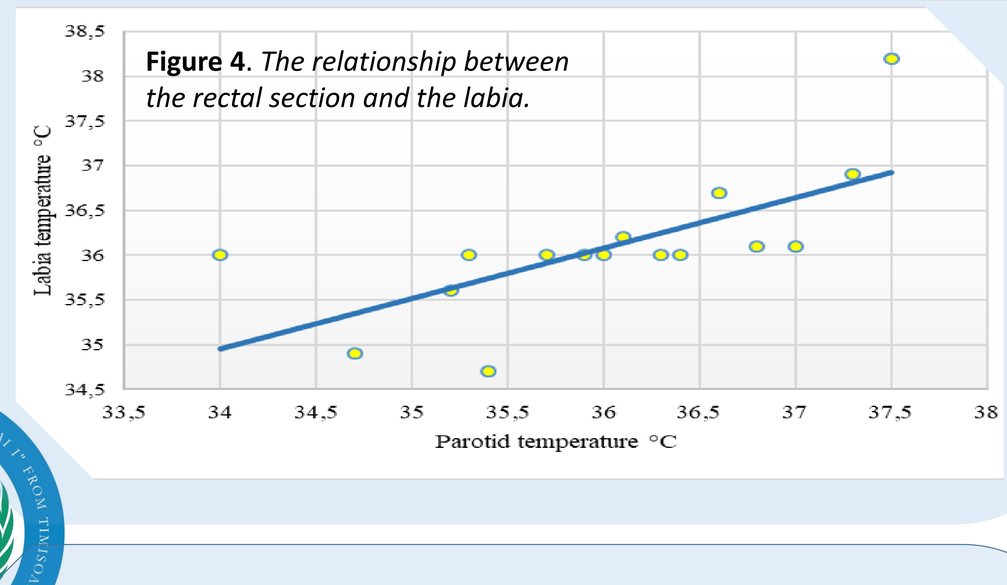


Figure 4. *The relationship between the rectal section and the labia.*

Results and discussions

Figure 1 shows the relationship between room heat around the sow and humidity around the sow (-0.853**). It is characterized by a strong negative correlation and significance.

Figure 2 shows that in the case of similar areas covered with less pig hair, the temperature is relatively high and approaches the value of the internal temperature. It is characterized by narrow importance significance.

Figure 3: The temperature relationship between the ear and the labia is 0.726**. This result can be a good measurement factor in the future, because the top, which is close to the brain, produces a good value and reflects the temperature fluctuation of the animal well-being.

Figure 4 shows the regressive representation of rectal section/labia: 0.622* The two areas are relatively close to each other, so they should have similar values. But the area of the udder is more blood-rich, and the circulatory blood network is higher, so it will represent a slightly higher value.

Conclusions

Our initial tests produced promising results. From our research, it can be established, among other things, that if the temperature around the pig is higher, the air will be drier. The sensation of heat is stronger at higher humidity than at lower humidity. Thus, the lower temperature combined with a higher humidity is favorable for the sow's body, which provides a favorable feeling of comfort, which helps economic production and improves the animal's well-being. Our hypothesis is that if we provide the animal's body with exactly that macro-environment, the environmental load will be much smaller, and we can alleviate it

Acknowledgement:

„Supported by the ÚNKP-22-3-SZTE-420 New National Excellence Program of the Ministry for Culture and Innovation from the source of the National Research, Development and Innovation Fund.”