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101. Effect of ambient temperature on lactating sows, a meta-analysis and modeling approach

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Because of their intense metabolism, lactating sows are highly sensitive to high ambient temperatures, which induce a reduction in their voluntary feed intake and milk production. This also results in an increase in mobilization of body reserves, which may impair reproduction after weaning, and a decrease in piglet weight gain. In the context of climate change which increases the frequency of periods of heat stress, the aim of this work was to quantify the relationships between ambient temperature and sow and piglet performance, and to use these relationships in a prediction model of nutrient utilization by sows. A database with 46 publications and 254 observations was built in order to adjust prediction equations for different criteria such as feed intake, respiratory frequency, body temperature, litter growth, and milk production. These equations were then incorporated into a simulation model including (i) a bioclimatic module predicting the effect of outdoor temperature on the indoor temperature perceived by the sow and (ii) a nutrition module predicting the effect of temperature on feed intake, milk production, energy and amino-acid utilization, and body reserves. This enabled a decision-making tool to be developed for the prediction of performance and nutritional requirement of lactating sows in different climatic conditions. The model was used to simulate the effect of climate on sow's and piglets' performance using climator climate database for West and South France. The results show significant effects of season and region on animal performance and nutritional requirements. The simulations performed for years 2045-2050 indicate that these effects tend to become more marked with climate change. In practice the model developed should enable feed composition to be better adapted to the season and to the geographical location of farms and to expected changes of climate for the future.