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**Climate change and resulting heat stress in German regions with high turkey densities**

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**Abstract:**

**Background/Objective:** Climate change and global warming may affect the well-being of livestock. Health and performance of farm animals could decrease by increasing heat stress, for instance. Particularly in poultry production, feathering and lack of sweat glands make birds more susceptible to heat stress than other monogastric animals. To assess future consequences of climate change for the turkey production in Germany, this study analyzed trends of the outer air enthalpy and of a temperature–humidity index (THI). The chosen thresholds of both parameters would very likely lead to severe heat stress in turkey barns.

**Methods:** Weather station data over a period of 50 years from 15 German districts with a high density of turkey production were used to investigate the heat input into the barns. Therefore, the parameters enthalpy and THI with defined thresholds (enthalpy: ≥67 kJ/kg; THI: ≥81) were used to assess potential heat stress. Trends in extreme weather conditions exceeding these thresholds were analysed and tested for significance using the Mann-Kendall test.

**Results:** For all districts the gradient of the trend lines was positive, indicating a general increase in high enthalpy values and high THI values over the last 50 years. These gradients show the increase from year to year and therefore an annual increase in the number of days with these extreme weather conditions. A statistically significant heat stress trend was found for enthalpy in nine out of 15 districts and for THI in 14 out of 15 districts.

**Conclusion:** The number of days on which turkeys may suffer from severe heat stress will increase in future. It can be expected that housing systems has to be adapted in response to the increasing challenges of heat stress.

**Keywords:** global warming, poultry, animal welfare, heat stress