THI effect on the frequency of medical treatments of dairy cows in Central Europe

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Introduction

Heat-stress has a significant impact on milk yield, fertility and health of lactating dairy cattle (Kadzere et al., 2002). The temperature-humidity index (THI) as a combination of temperature (T) and relative humidity (RH) is widely used to evaluate heat-stress, while the no. of medical treatments (MT) can be used as an indicator for health. The aim of this study was to estimate the effect of the THI on the incidence of MT in dairy cows in Central Europe.

Materials and Methods

- Climate data (hourly T and RH) obtained from weather stations for the years 2003 and 2005
- THI = (1.8 * T + 32) – (0.55 – 0.0055 * RH) * (1.8 * T – 26) (NRC, 1971)
- THI divided into 4 classes: < 40, ≥ 40 to < 50, ≥ 50 to < 60, ≥ 60
- Eight Holstein-Friesian herds (55 – 170 cows), loose-housing systems, Lower Saxony, Germany
- Records of all MT, divided into diagnostic cluster: metabolism, udder, fertility, foot/leg (antiparasitics, antibiotica for dry cow therapy and vaccinations excluded)

Results and Discussion

THI values average was 49.5 (± 12.1) in 2003 and 49.9 (± 10.9) in 2005, respectively. Maximum values were > 60 ⇨ threshold for heat stress in dairy cows (Brügemann et al., 2011). The monthly maximum THI was 73.9 in 2003/8 and 72.2 in 2005/5, whereas the minimum was 10.2 in 2003/1 and 18.5 in 2005/3.

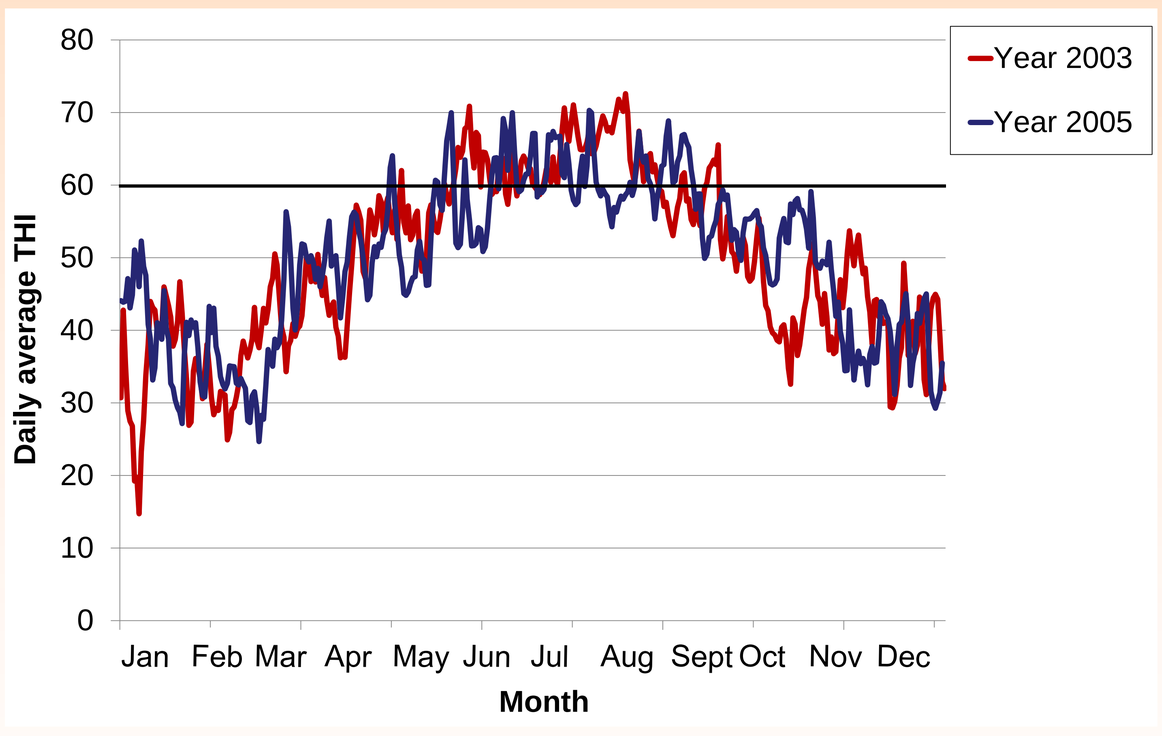

Fig.1 Daily mean THI values averaged over six weather stations from Lower Saxony, Germany (2003 and 2005).

37.4 % of the treatments belonged to the complex metabolism, 32.9 % to udder, 21.6 % to fertility and 8.1 % to foot/leg.

The incidences were neither influenced by the year and the season ($p > 0.05$), nor by the THI class ($p > 0.05$). While the incidence of metabolic treatments increased in tendency with increasing THI, the no. of udder treatments decreased, which corresponds to the results of Shatele (2009).

Fig.2 Least squares means (SE) of udder, fertility, meatbolic and foot/leg incidence from eight dairy herds in Lower Saxony, Germany (2003 and 2005) according to THI classes.

In tendency the incidences of metabolic treatments were higher in summer, while udder treatments had the highest occurence in winter and the lowest in summer ($p > 0.05$).

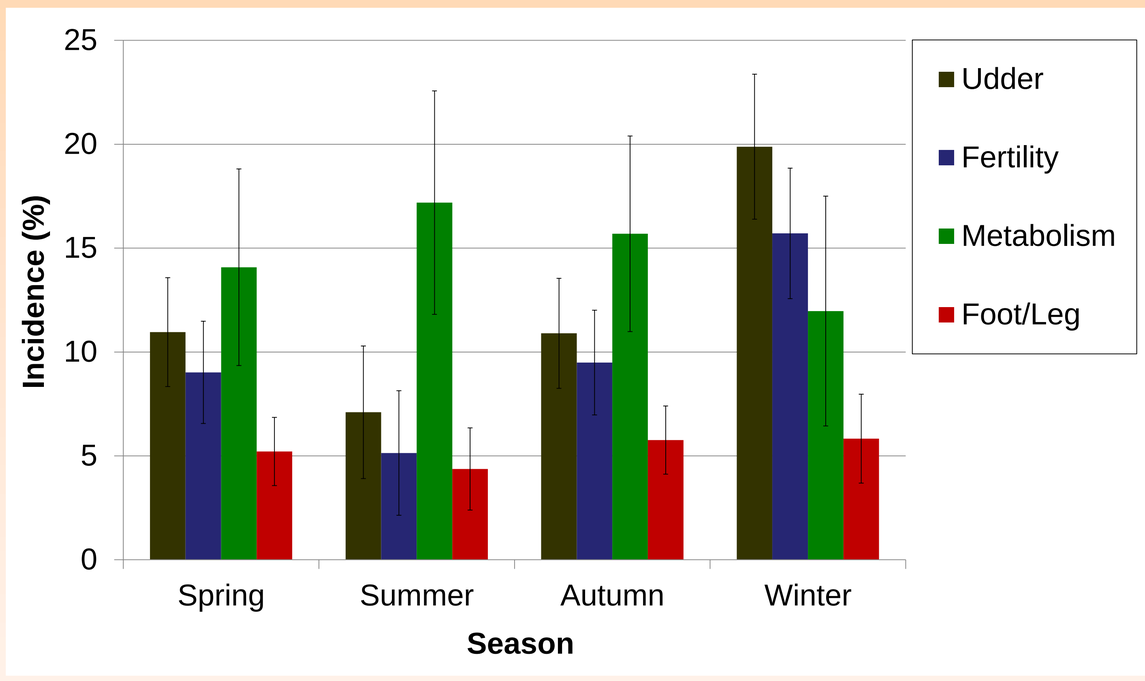

Fig.3 Least squares means of udder, fertility, metabolism and foot/leg incidences from eight dairy herds in Lower Saxony, Germany (2003 and 2005) according to season.

Conclusion

Climatic conditions exceeded the heat-stress threshold for dairy cows during summer. However, there were no significant effects of heat-stress on the incidence of medical treatments of dairy cows.

References: Brügemann et al. (2012) Archiv Tierzucht 55: 13-24; Kadzere et al. (2002) Live Prod. Science 77: 59-91; NRC (1971) National Academy of Sciences, Washington, DC.; Shatele (2009) Int. Journal of Dairy Science 4: 57-66.