

Physiological, productive and metabolic parameters during heat stress in Brown Swiss and Holstein

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Holstein Frisian (HF) and Brown Swiss (BS) are the two most represented in Italy for milk production. Generally, the BS is highly appreciated because it is considered more resilient to more unfavorable environmental conditions. In animals subjected to intense metabolic efforts, the management of heat stress has become one of the most pressing issues for the farmer. Global climate change has not only raised the average level of temperatures but, has expanded the number of hours and days in which animals are above the neutrality threshold, in latitude. Active cooling strategies are continuously developing but there is a need to identify news indicators of stress on the animal to reduce their economic impact or to be able to act strategically on the genetic selection of more resilient animals. In line with the practices of precision zootechnics, the objective of this work was the evaluation of the influence of thermal stress on physiological, productive and metabolic parameters. 77 multiparous cows from the same farm equipped with artificial ventilation (2nd or 3rd parity and within the 200 day in milk) were selected. Two 4-day replicates, in the absence of ventilation, were carried out with 3 days of rest, monitoring the THI (temperature humidity index) through digital data loggers at 5-minute intervals. Daily, at 3 intervals (4AM, 15PM, 20PM) the following parameter were collected: respiration rate, rectal, vaginal, iliac, eyes and snout temperature were monitored, and during the two daily milking the daily milk/kg day, protein, fat, acetone, β -hydroxybutyrate, citrate, and urea content. The maximum THI during the three moments was respectively 74.50, 84.07 and 82.62 during the test, and 64.95, 74.85 and 71.40 with ventilation. The results show a strong inflexibility of the breed and a significant ($P < 0.01$) of the time of day on the physiological parameters and limited to the kg of milk and BHB. Some parameters such as percentage of protein and fat were significantly influenced by the day of the test. Physiological parameters showed a significant effect of consecutive day duration of heat stress, greater susceptibility of the HF breed and greater nocturnal resilience for the BS.

Effect of acclimatisation in physiological parameters of high-yielding dairy cows

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Heat stress alter the physiological status and the energetic balance in high producing animals. Acclimatisation is a thermoregulatory adaptation to heat stress with detrimental effects on productivity. We hypothesised that high-yielding dairy cows (HP; $\geq 9,000$ kg – 305 days in milk; $n=7$) suffer a more significant influence of elevated environmental temperatures than low-yielding cows (LP; $< 9,000$ kg – 305 DIM; $n=6$). Physiological and milk composition data was collected in summer (5 days with mean environmental temperatures of 23.5 °C – heat stress) and winter (5 days with mean environmental temperature of 6.6 °C – thermoneutrality). Respiratory rate (HP: 63.95 \pm 12.35; LP: 64.34 \pm 13.67 movements/minute), sweat rate (HP: 77.70 \pm 48,90; LP: 75.86 \pm 45.02 g/m²/h) rectal temperature (HP: 38,87 \pm 0,72; LP: 38,76 \pm 0,63 °C) were significantly higher in summer than in winter across both groups, indicating a response to mild heat stress. Plasma triiodothyronine levels were lower in HP than LP in summer, indicating a higher degree of acclimatisation in HP cows. Haematocrit and hemoglobin were significantly higher in summer but not different between groups. Regarding milk production, HP produced more milk than LP, but the difference between groups was shorter in summer than winter (17,90% and 22,30%, respectively). There were no differences in milk parameters within groups, except urea in the summer period (293.62 mg/kg and 253.69 mg/kg for HP and LP, respectively). Milk fat and protein were significantly lower in summer than winter. These results showed that elevated environmental temperatures alter the physiological status in both groups. Cows with different milk yield had similar first responses to heat stress. However, during the acclimatisation process, HP decreased metabolism rate while alterations in nitrogen pathways were observed.

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Welcome to the EAAP 2022 in Porto

On behalf of the Portuguese Organizing Committee, we are honored and delighted to welcome you at the 73rd EAAP Annual Meeting being held at the wonderful world heritage city of Porto, in Portugal. The last EAAP meeting held in Portugal was in 1987. 35 years and one pandemic later, Portugal has the privilege to finally again host the annual meeting of EAAP.

The years we are living show us that our sector never stops, that animal production continues to put food in people's houses, and that we are an essential part of society. This year, recent war events at our door have put the society under high economic and societal changes. To add up we are faced with the undergoing climate urgency and still adapting to the post pandemic crisis. This conjuncture increases the challenges of Animal Science making them even more relevant than ever, with a consequent higher engagement and responsibility from the scientific community.

The program will cover various areas of knowledge, such as nutrition, genetics, physiology, animal health and welfare, livestock farming systems, precision livestock farming, insect production and use, cattle, horse, pig, sheep and goat production. These topics will be filled with innovation and recent scientific results leading animal production in the right path.

The European Federation of Animal Science (EAAP) Annual Meeting gives an opportunity for the application of new ideas in practice through many parallel sessions, poster presentations, and discussions about scientific achievements in livestock production all around the world. The Plenary Session, under the topic "The coexistence of wildlife and livestock" is a must of 2022 Porto Meeting.

Moreover, as we know, this Meeting is a privileged discussion forum where the research community meets with the industry, to discuss and plan for and how to address the multiple challenges that the animal science sector has to cope with in the upcoming years. All these activities make the EAAP Annual Meeting one of the largest animal science congresses in the world.

Of course our unforgettable social program throughout the week promotes all this scientific activities and networking even more. Starting with the welcome ceremony the programme follows with a typical Portuguese night, a gala dinner and finishes with remarkable technical tours. In parallel an exquisite accompanying persons program is available.

We hope that the 73rd Annual Meeting of EAAP: EAAP 2022, is a unique opportunity to add work with pleasure. We wish you a very pleasant stay in our beautiful city and country!

Ana Sofia Santos and Olga Moreira

Chairmen of the Portuguese Organizing Committee