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THE IMPACT OF WEATHER CONDITIONS ON THE WELFARE AND PRODUCTIVITY OF DAIRY COWS

Global climate change and increasing average air temperatures have a substantial impact on dairy farming productivity. Under heat stress caused by high temperatures, dairy cows may suffer serious adverse effects that compromise not only milk yields but also overall animal health. Research indicates that rising environmental temperatures can reduce productivity and impair reproductive functions in cows [1–2].

In Ukraine, examining the effects of temperature fluctuations on cow productivity is particularly pertinent, as high summer temperatures have been shown to significantly reduce milk yields, especially in the Brown Swiss breed [3]. Heat stress is a critical challenge to dairy production efficiency, as reduced productivity in cows can result in economic losses for livestock farmers.

Optimising microclimatic conditions within livestock facilities is therefore essential for effective dairy farm management. It is well established that inadequate ventilation and high indoor temperatures degrade air quality, which in turn adversely affects animal health [4–5]. Consequently, research into the adaptation of dairy cows to high temperatures in industrial settings is a crucial step towards improving their productivity and welfare in the context of global climate change.

The aim of this study was to assess the impact of weather conditions on the welfare and productivity of dairy cows, using factor analysis to process data. Based on 2023 data from the DairyComp 305 herd management system at a dairy farm in the Kyiv region (50°49′11″N, 31°49′22″E), this study evaluated the effects of seasonality and the average and maximum daily values of the temperature-humidity index (THI) on milk productivity, dry matter intake, mastitis incidence, and lameness. The percentage contributions of these factors to economically important traits in cows were determined through biometric analysis as outlined by Kovalenko et al. (2010) and via ANOVA results processed in Statistica 12 (StatSoft, Inc., Tulsa, OK, USA).

The animals were kept year-round in loose housing within naturally ventilated facilities. Their diet remained consistent across all seasons and was balanced for essential nutrients, including high-quality feeds such as barley, oat, and maize grain,

maize silage, alfalfa silage, grass hay, and wheat straw. Additionally, the cows were fed rapeseed, sunflower, and soybean meal, dried beet pulp, and mineral-vitamin supplements. Diet ingredients were mixed using specialised mixers equipped with electronic scales, with feed frequency and quantity managed by a computer program. The cows had free access to drinking water provided by group drinkers.

The data obtained indicate that seasonality (37.5%), the temperature-humidity index (2–30%), and dry matter intake (7.4%) significantly influenced Holstein cows with a milk yield of 33–35 kg/day, maintained under year-round loose housing in naturally ventilated facilities with a total mixed ration. The effects of seasonality and maximum THI values on mastitis incidence were approximately 30%, while the impact on lameness within the herd was around 25%.

In conclusion, seasonal changes, the temperature-humidity index, and dry matter intake have a marked effect on milk productivity, mastitis incidence, and lameness within the herd.

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