

Abstract

The biology and allergen production of dust mites are significantly influenced by hygrothermal factors (temperature and humidity). This thesis summarizes studies dealing with the effect of temperature and humidity on the population growth of mites species *Dermatophagoides farinae*, their metabolism (represented by their respiration rate) and migration patterns within a temperature gradient (simulating conditions in the vertical section of a mattress). *D. farinae* colonies reared at different combinations of temperature and humidity (in the range of 15-35 °C and 62-94% RH) showed the average highest and stable population growth at 28 °C and 85% RH. The highest CO₂ production of this species was – within studied temperature (15-35 °C) - observed at 30 °C. At this temperature there were two respiration peaks at RH 90% (smaller peak) and 65% (larger peak). Within a temperature gradient (19-41 °C), fed mites were most often found in the sector with a temperature range of 32-36 °C. This phenomenon was observed in both experimental designs: in a stable (24 h) temperature gradient, but also in experiment with 5 days of alternating cycles of the same gradient (8 h / day) and room temperature (16 h / day). Conversely, the highest number of non-feeding mites was found in the sector with a temperature range of 19-23 °C in both experimental variants. The results of our studies may be interpreted as suggesting that feeding mites might preferentially emerge in the most upper zones of the mattress (heated by body of resting human up to 32-36 °C). In contrast, conditions suitable for their population growth could be encountered in slightly deeper zones of the mattress, where mites also show increased metabolic activity (respiration). Metabolically less active, non-feeding mites, on the other hand, could be concentrated in the deeper zones of the mattresses, where they are also well protected from possible disturbances.