Abstract

House dust mites are one of the most important allergenic agents found in households worldwide. The biology of these mites is significantly affected by hygrothermal factors – especially by temperature and humidity. The study is focused on the influence of temperature and humidity to the behavior of *Dermatophagoides farinae* within a thermal gradient (simulating a vertical section of a mattress), on its metabolism (represented by respiration rate) and population growth. Within a constant thermal gradient (19-41 °C) run for 24 h *D. farinae* mites most often received food in the sector with a temperature range of 32-36 °C. In experiment with 5 days of alternating cycles of the same gradient (8 h / day) and room temperature (16 h / day) was the sector with a temperature range of 32-36 °C for mite´s feeding also the most prefered. In contrast, in both variants of the experiment, non-feeding mites preferred the sector with a temperature range of 19-23 °C (or rather, the largest number of them were found in this sector during the evaluation). During the measurement of respiration, mites of this species showed significant CO_2 production when were incubated at temperatures of 25- 30 °C. Out of the studied combinations of temperature and humidity, the highest respiration was measured when mites were incubated at 25 °C and 65% RH. In another experiment (out of 20 studied combinations of temperature and humidity), the highest and stable population growth was observed when mites were reared at 25 °C and 85% RH. All the results of this study suggest that within the mattress, food-receiving mites may preferentially occur in relative proximity to its surface. The top layers of mattress are heated by the temperature of the human body (up to values close to 32-36 °C) when the bed is regularly occupied during the night. On the other hand mites that are not currently feeding could migrate to the deeper layers of the mattress, where they may stay in lower temperatures (20-25 °C) and higher humidities (aprox.65-75 %) which are – according to the results of this thesis – optimal for their development, reproduction and population growth.