

Influence of selected meteorological factors on the development of varroasis in honey bees

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Disease varroosis (caused by the overgrowth of the parasite *V. destructor*) is currently the most serious global problem in the field of honeybee survival. This study investigated the impact of local environmental factors on *Varroa destructor* mite infestation in honey bee (*Apis mellifera carnica*) colonies. The research explored the relationship between natural mite fall and biotic factors (bee queen line – Singer and Sklenár) and abiotic factors (daily maximum, minimum, average temperature and relative humidity, and hive location – open space vs. Apihouse). Four bee colonies were established, two with Singer queens and two with Sklenár queens, with two hives of each line located in the open and two in the Apihouse. Mites falling onto oiled monitoring boards were counted. Meteorological data (temperature and humidity) were collected every 5 minutes using an automatic meteorological station. Statistical analyses, including correlation/regression analysis and Mann-Whitney U tests, were performed to assess the relationships between mite fall and the measured factors. Results revealed a significant temperature dependence of *Varroa* mite fall. Increased mite fall was observed when daily maximum temperatures ranged from 25.1 to 31.7°C and minimum temperatures were above 5.5°C. The highest mite fall occurred in open-air hives when temperatures increased between 13.9 and 28.7°C and humidity decreased between 47.2 and 22.7%. Overall, mite falls in the open-air hives were 46.57% higher than in the Apihouse hives, indicating that hive location significantly affected mite fall. The Sklenár bee line exhibited a 26.27% higher mite fall than the Singer line, suggesting a role for bee line characteristics in mite infestation levels. All colonies were treated with a natural veterinary product (wormwood, thyme, and mint oils) when natural mite fall exceeded three mites, and all colonies survived the winter. This study demonstrates the combined influence of temperature, humidity, hive location, and bee line on *V. destructor* infestation, providing valuable insights for beekeepers in developing effective and environmentally friendly management strategies for varroosis.

Keywords: air temperature, Apihouse, honey bee line, natural mite fall, relative humidity, *Varroa destructor*.

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