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The beekeeping sector in the United Arab Emirates faces several challenges due to harsh climatic conditions and limited natural forage availability. The presence of various pests and diseases further threatens colony health, leading to increased mortality and reduced honey production. Therefore, this study aimed to examine the presence of parasites and pathogens in local bee colonies, with a focus on *Varroa destructor*, bee trypanosomatids, and *Nosema* spp.

Adult honey bees (*Apis mellifera* L.) were collected from different apiaries across the UAE. From each hive, samples of 60–100 worker bees were taken. Additionally, *Varroa destructor* mites (adult females) were dislodged from approximately 300 worker bees using the powdered sugar method and collected for further analysis. Honey bee samples were mechanically homogenized using a mortar and pestle, and the resulting homogenates were examined microscopically for *Nosema* spp. spores. Selected *Nosema*-positive samples underwent DNA extraction and PCR identification to determine the *Nosema* species. These samples were also screened for bee trypanosomatids using universal PCR primers. Furthermore, DNA was extracted from adult *Varroa* mites using a commercial DNA extraction kit, and mite haplotypes were confirmed based on the partial cytochrome oxidase 1 (*cox1*) gene sequence.

Microscopic examination of bee homogenates detected *Nosema* spp. spores in 62% of the samples, while molecular analyses confirmed the presence of *Nosema ceranae* in all analyzed samples. Additionally, *Varroa destructor* was present in 58% of hives, and all mites belonged to the Korean haplotype. Interestingly, 10% of the analyzed samples were positive for the bee trypanosomatids.

Our study highlights a significant threat to honey bee colonies in the UAE, primarily due to the high prevalence of *Nosema ceranae* and *Varroa destructor*. The detection of bee trypanosomatids needs further investigation to assess their potential impact on honey bee health.

To mitigate these threats and maintain colony health, beekeepers should implement improved *Nosema* and *Varroa* management strategies, including regular monitoring, nutritional support, and sustainable treatment approaches.