

Dispersal of *Tropilaelaps mercedesae* mites from honey bee colonies

Dan Aurell¹, Hyunha Oh², Rogan Tokach¹, Chuleui Jung², Geoffrey R. Williams¹

¹Department of Entomology & Plant Pathology, Auburn University, Alabama, United States of America

²Department of Plant Medicals, Andong National University, Andong, Republic of Korea

Tropilaelaps mercedesae mites are severe parasites of the western honey bee (*Apis mellifera*) that have spread to multiple countries outside of their native range. It is thought that phoresy on adult bees (e.g., during drifting or robbing) is one way that *Tropilaelaps* mites disperse between colonies. This idea is supported by our recent study documenting *T. mercedesae* leaving *A. mellifera* honey bee colonies on adult bees. Our data suggested that high brood infestations promote dispersal out of colonies, but it was not clear how brood infestation rate affected dispersal – including whether there is a threshold of brood infestation that triggers dispersal. A better understanding of factors driving dispersal is important to responding appropriately when *Tropilaelaps* mites are detected in new areas. To understand the relationship between brood infestation rate and phoretic dispersal, we uncapped worker brood to assess *Tropilaelaps mercedesae* and *Varroa destructor* infestation rate of colonies and used funnel traps to collect bees exiting the colonies. Collected bees were subjected to an alcohol wash to dislodge mites before being counted. We observed the first *Tropilaelaps* mites on exiting bees at 5% infestation of worker brood cells. Above 5% infestation, we observed a strong increase of dispersal with increasing brood infestation. The relationship of brood infestation and number of mites on exiting bees was remarkably similar for *Tropilaelaps* and *Varroa* mites. These results indicate that *Tropilaelaps* mites, like *Varroa*, can be a landscape-level problem where mite populations can disperse among hives, apiaries, and beekeeping operations. These results also have implications for appropriate responses if *Tropilaelaps* mites are detected in a new region; a brood infestation of greater than 5% in a colony would indicate a high risk that mites have dispersed through drift of bees or robbing, and warrant inspections of colonies within flight distance.