

INTERSPECIFIC LEARNING IN BEES ENHANCES A PARASITE RESISTANCE TRAIT

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Abstract

Although animals can learn to avoid parasites by observing the behavior of other species, there is limited evidence for interspecific learning in relation to parasite resistance. Since the signals and ecological niches of eastern honey bees (*Apis cerana*) and western honey bees (*Apis mellifera*) are very similar, it is possible that interspecific learning could be used to promote their parasite resistance traits. Here, we demonstrate that the grooming behavior of *A. mellifera* against the ectoparasitic mite *Varroa destructor* can be enhanced through interspecific learning from original hosts, *A. cerana*. In a laboratory assay in Thailand, newly emerged *A. mellifera* workers ('learners') were paired with either a conspecific or a heterospecific *A. cerana* worker ('demonstrators'). The learners' grooming behaviours were assessed before and after eight learning bouts, during which their paired demonstrators had been experimentally infested. The results show that learners paired with *A. cerana* demonstrators displayed a lower grooming latency and more pronounced grooming behaviors after the social learning bouts than those paired with conspecifics. If these results can be replicated in colonies under field conditions, they could provide practical solutions to the challenges posed by ectoparasitic mites, particularly in Asia where original resistant and introduced susceptible host species coexist. More broadly, the data suggest novel avenues to promote resilient beekeeping through social learning and to study the mechanisms underlying parasite resistance in social insects.