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Impact of humidity on egg hatching in small hive beetles: laboratory and field data

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Eggs constitute a critical stage in insect life-histories. As they are often left unprotected, they can be highly sensitive to environmental conditions. Determining the optimal environmental conditions for egg hatching can serve as a valuable tool in developing targeted control and management strategies for pests and parasites. Surprisingly little is known about the role of humidity in egg hatching of small hive beetle, Aethina tumida, an invasive beetle parasite of honey bee colonies. Therefore, we decided to test the impact of humidity on small hive beetle egg hatching rate under laboratory conditions and complemented it with field experiments in honey bee colonies. The experiments were performed in summer 2024 in Auburn, USA. In the laboratory, slides with small hive beetle eggs were incubated at seven humidity levels ranging from 45% to 95% at 250 C and their hatching success was recorded over five consecutive days. In the field, slides with SHB eggs were placed on top of and underneath frames inside sun-exposed [N=6] and shaded colonies [N=6] for three days. In addition, humidity and temperature were recorded inside of the colonies. The preliminary results indicate that a humidity level above 65% is necessary for most eggs to hatch. Interestingly, in the field, egg hatching success at the bottom of the colonies was unaffected by sun exposure, while fewer eggs hatched at the top in sun-exposed colonies. The field hatching data will be further analysed in relation to the recorded humidity and temperature conditions. Full results and their implications will be presented and discussed.