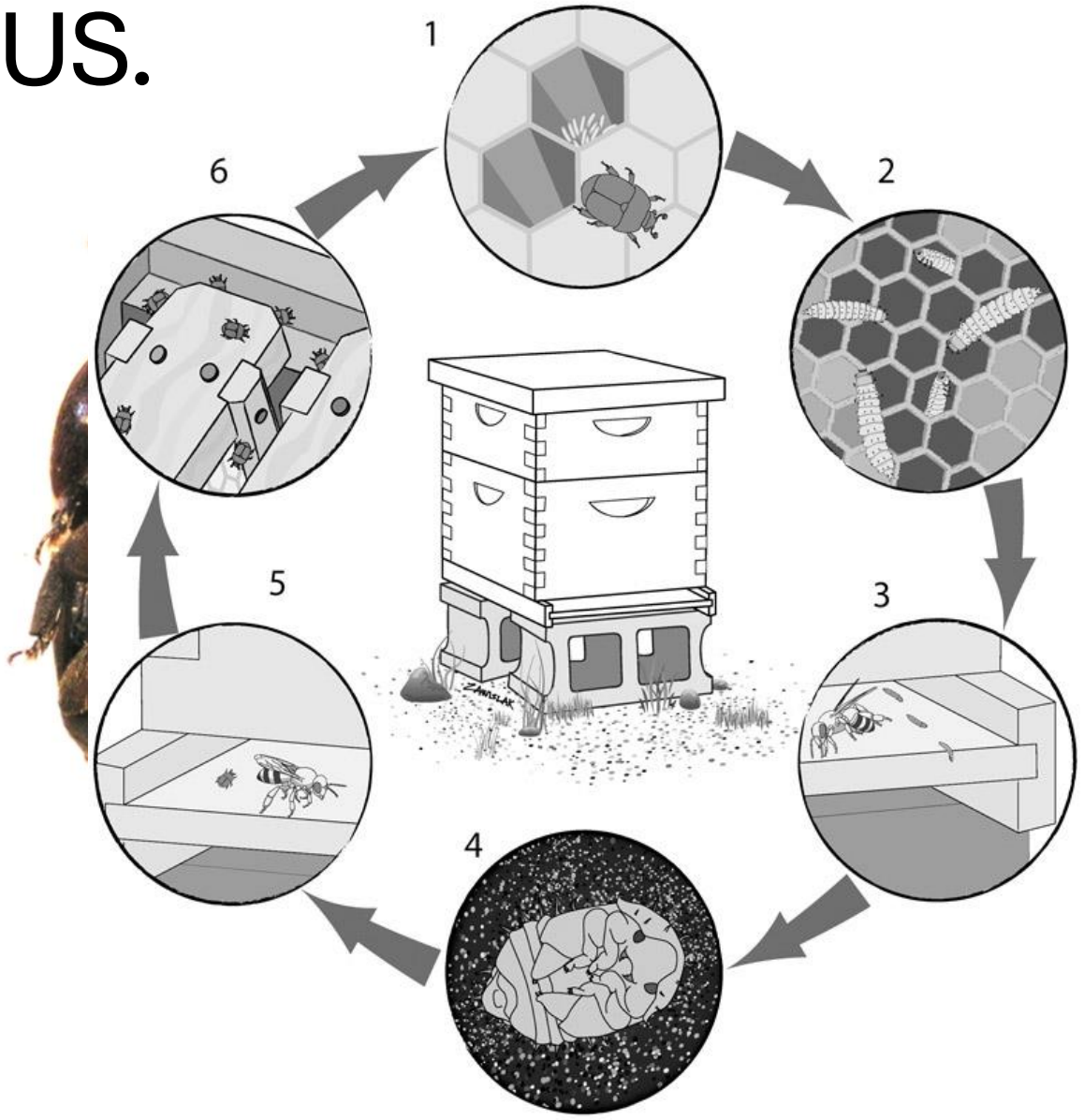
The Small Hive Beetle, An Emerging Pest In Washington

Riley Reed

James D. Ellis, University of Florida, Bugwood.org

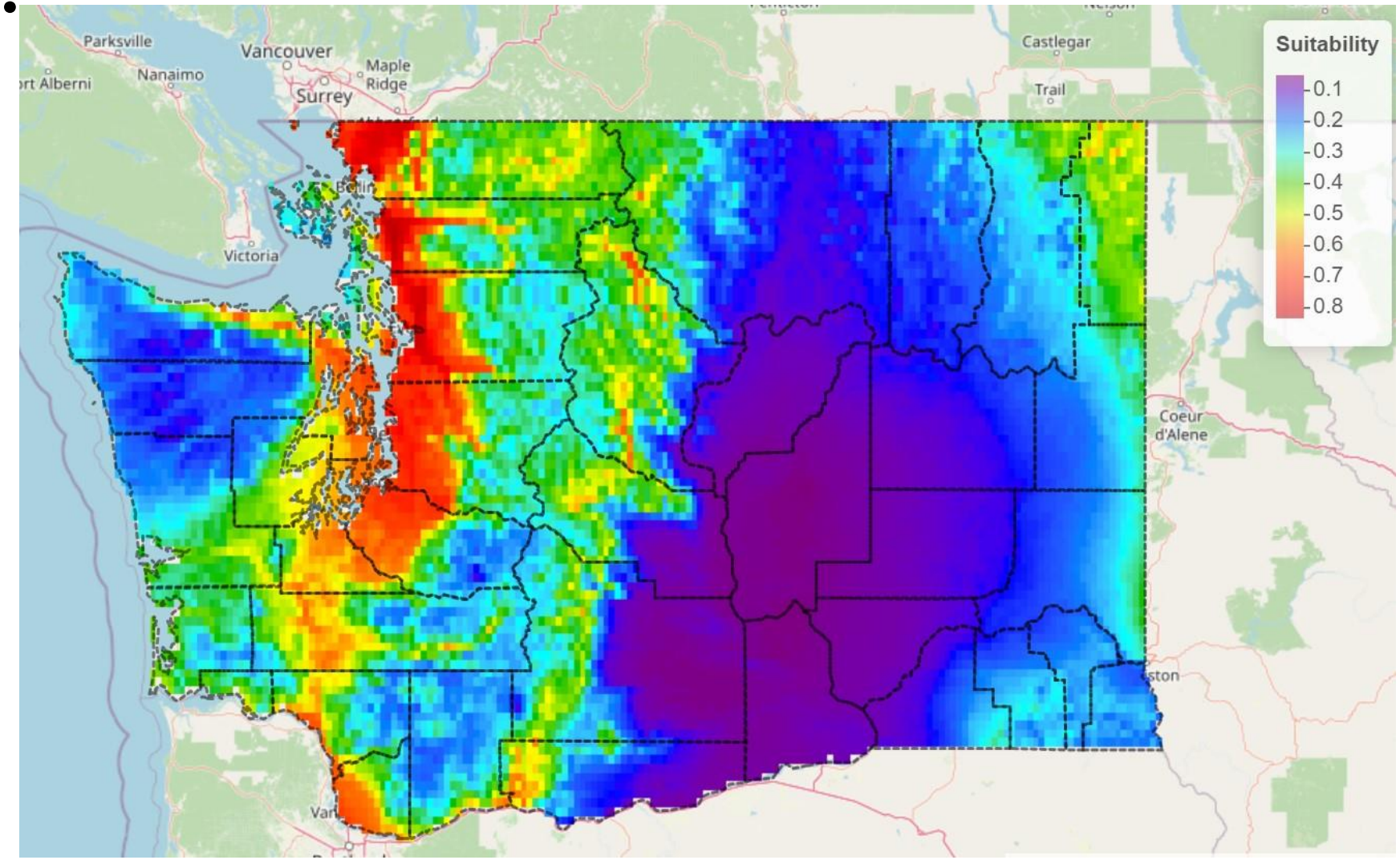
Small hive beetles are a common pest in the southern US.



Ellis, University of Florida, Bugwood.org

Courtesy of Jon Zawislak

Small hive beetles may become a common sight.



Courtesy of Gengping Zhu

A colony was established using wild caught beetles

Young larvae were transferred to cages after being dipped in a spore solution.

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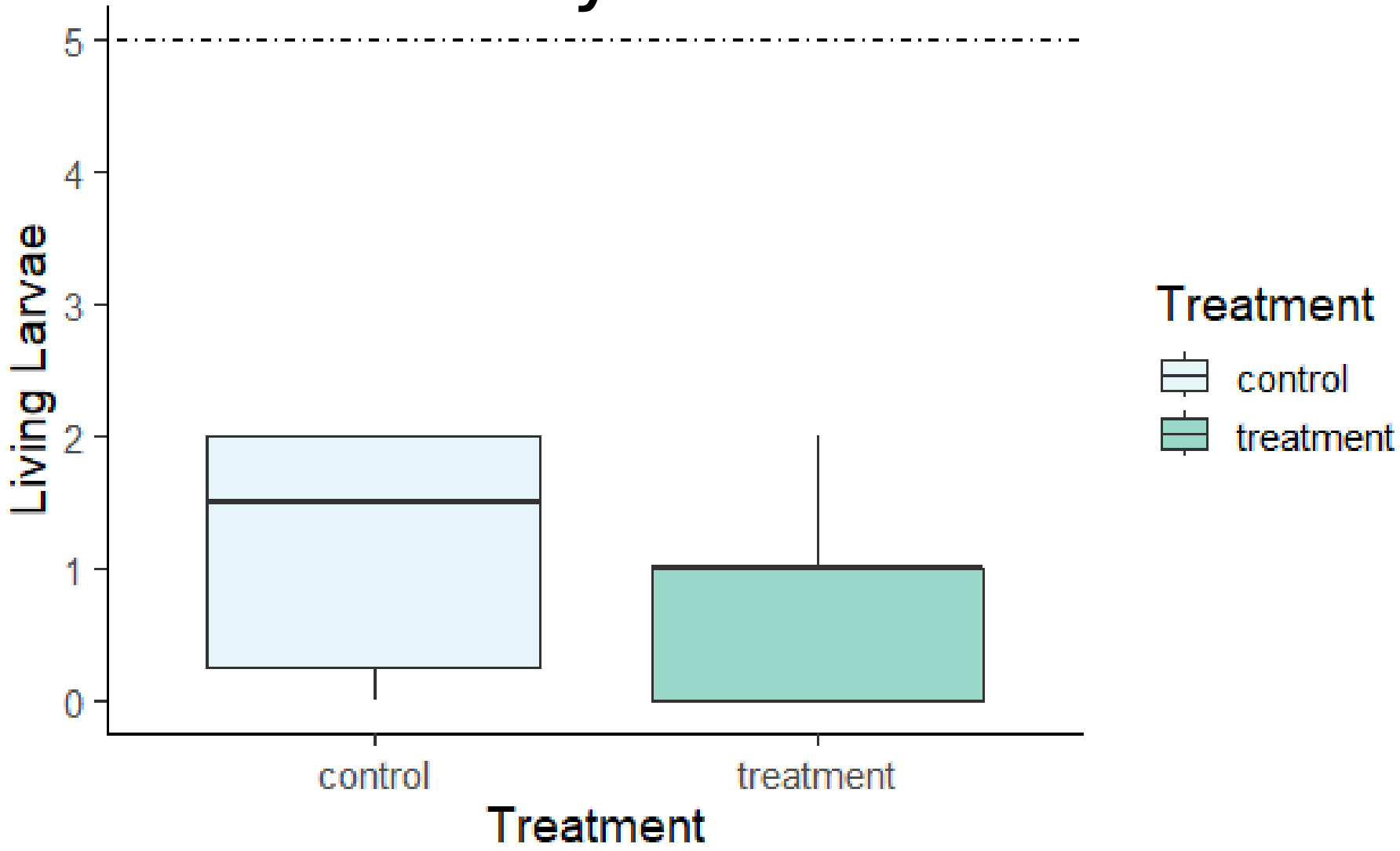
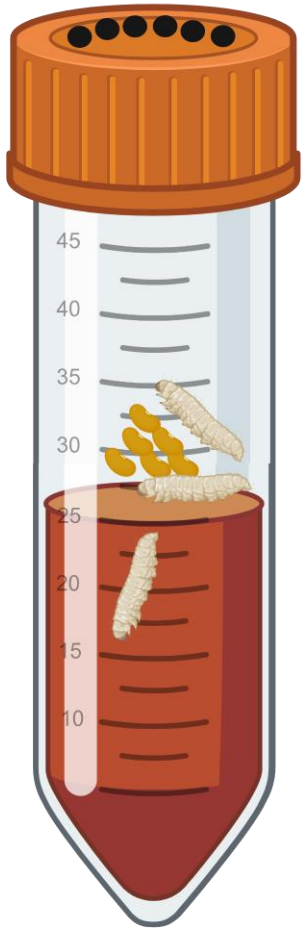
Metarhizium treatment did not significantly increase larva mortality.



Despite this setback, we will continue this research.



Our new guide provides more information about small hive beetles.

A GUIDE TO THE SMALL HIVE BEETLE

AN EMERGING PEST IN WASHINGTON STATE

Introduction

The small hive beetle (SHB), *Aethina tumida*, is native to sub-Saharan Africa. SHB are members of the family Nitidulidae, nicknamed "sap beetles." This family of beetles is known to feed on decaying matter, pollen, fermenting plant juices, and decaying fruits. Small hive beetle is one in a handful of Nitidulids that live exclusively in honey bee hives but the only one to cause extensive damage (Ellis et al. 2008). Apart from the European Cape honey bee subspecies, *Apis mellifera capensis*, that is well adapted to small hive beetle infestation (Ellis et al. 2003), SHB has become a major pest to honey bee colonies and stored honey globally. These beetles were first detected in South Carolina in the 1990s (Schäfer et al. 2019) and quickly expanded their range within the US, being most prevalent in the southeastern states. The widespread range expansion of small hive beetles is likely facilitated by international trade of honey bee colonies and bee products.

Recently, reports from northwestern Washington indicate presence of small, sustained populations of SHB. This Extension publication will give Washington State beekeepers information to detect, accurately identify, monitor, treat, and report SHB infestation(s) in their region.

Potential Establishment in Washington State

Small hive beetles prefer climates with high humidity and temperatures for reproduction. Historically, SHB has been considered a transient pest, introduced from packages or bee products with little to no potential to sustain, in Washington State. It has long been assumed that climate and soil conditions would inhibit establishment of this species in Washington State. However, recent research has revealed that global warming may contribute to the expanse of suitable habitat for this invasive species. Under current and future climate scenarios, models of SHB survival and pupal development time, in response to soil conditions were created, then suitable regions were classified (Cornelissen et al. 2019); this work showed potential SHB invasion into more temperate regions.

Correlative ecological niche models were employed to make a heat map of SHB habitat suitability for Washington State, with red and orange being most suitable for reproductive populations and light blue and purple being least suitable (Figure 1). Highly suitable habitats were identified in low elevation areas of the Puget Sound and Cascade Mountain Range in western Washington. Northern areas near the Pacific Coast Range are not currently suitable areas for SHB. Northeastern Washington has relatively suitable climate, while most areas in eastern and central Washington that are characterized by arid high desert, rolling hills, and sagebrush, do not have suitable climate for SHB. The WSU Zhu Lab developed a habitat suitability map that allows users to zoom in on their region(s) to assess risk of sustained SHB populations (Figure 1).

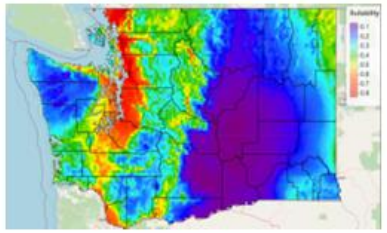


Figure 1. Heat map of habitat suitability based on ecological niche models. *Source:* The Zhu Lab, WSU.

Beyond the theoretical modeling that demonstrates potential invasion of small hive beetles in Washington State, recent reports and verified samples have been submitted to Washington

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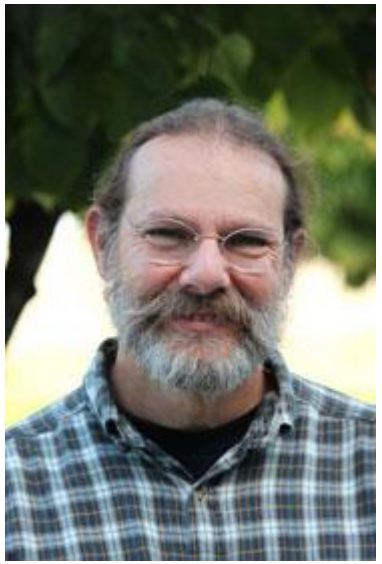

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