Zoosymposia 22: 084–084 (2022)
https://www.mapress.com/j/zs

Abstract

ISSN 1178-9905 (print edition)
ZOOSYMPOSIA
ISSN 1178-9913 (online edition)

https://doi.org/10.11646/zoosymposia.22.1.48

The lychee erinose mite (*Aceria litchii*), in the Context of the Mite-Plant Interaction*

LIVIA M. S. ATAIDE[1], JAQUELINE F. DELLA VECHIA[1], PAUL E. KENDRA[2], RONALD OCHOA[3], JOHN HAMMOND[4], DANIEL CARRILLO[1] & ALEXANDRA M. REVYNTHI[1]

[1]*Tropical Research and Education Center, University of Florida, Homestead, FL 33031, USA*
[2]*Subtropical Horticulture Research Station, United States Department of Agriculture, Agricultural Research Service, Miami, FL 33158, USA*
[3]*Systematic Entomology Laboratory, United States Department of Agriculture, Agricultural Research Service, Beltsville, Maryland, 20705, USA*
[4]*Floral and Nursery Plants Research Unit, United States Department of Agriculture, Agricultural Research Service, Beltsville, Maryland, 20705, USA*
Corresponding author: lsilvaataide@ufl.edu; https://orcid.org/0000-0003-2159-7267
Jaqueline F. Della Vechia https://orcid.org/0000-0001-7648-0627
Paul E. Kendra https://orcid.org/0000-0003-4425-0733
Ronald Ochoa https://orcid.org/0000-0003-1680-3601
John Hammond https://orcid.org/0000-0001-7593-747X
Daniel Carrillo https://orcid.org/0000-0003-2291-1844
Alexandra M. Revynthi https://orcid.org/0000-0002-3284-3104

**In*: Zhang, Z.-Q., Fan, Q.-H., Heath, A.C.G. & Minor, M.A. (Eds) (2022) *Acarological Frontiers: Proceedings of the XVI International Congress of Acarology (1–5 Dec. 2022, Auckland, New Zealand)*. Magnolia Press, Auckland, 328 pp.

The lychee erinose mite (LEM), *Aceria litchii*, is a serious pest of lychee. This tiny mite induces the formation of erinea, which are open galls with hypertrophic trichomes. Erinea can form on leaves, flowers, fruit, and other plant structures, hampering plant growth and yield. Four distinct types of erinea can be observed: light white (stage 01), white (stage 02), amber (stage 03), and dark erinea (stage 04). To date, it is unknown how and why *A. litchii* induces the formation of erinea on lychee plants. It has been hypothesized that mites use the erinea to hide and protect themselves from biotic and abiotic stressors. We recently showed that the erinea protects mites from pesticides and may also confer protection against natural enemies. Erinea might also protect *A. litchii* from adverse environmental conditions, such as low and high humidity, extreme temperatures, heavy rain, etc. Aiming to uncover the role of erinea in this mite-plant interaction system, we investigated (i) how lychee plants respond to the formation of each type of erineum (ii) what is the population size of *A. litchii* in each erineum stage, and (iii) whether the erinea can protect *A. litchii* from temperature fluctuations that might occur in the environment. Infested lychee plants (var. Mauritius) were used to assess phytohormones accumulation (JA, SA), erineum developmental time, erineum density, and mite population size in all four erineum stages. Phytohormone analyses revealed that JA and SA accumulation was significantly higher in mite-infested plants when compared to uninfested plants. The synthesis of both phytohormones was increased in stages 01, 02, and 03, but a decline was observed in stage 04. Erineum development was assessed by monitoring the days each erineum stage lasted, from infestation to erineum senescence. Low-temperature scanning electron microscope (LT-SEM) was used to evaluate erineum density. The population size of *A. litchii* in each erineum stage was assessed by scoring the number of mites found alive in each erineum type. Using a similar approach, we investigated the effect of different temperatures (15°C, 25°C, and 35°C) on the duration of erineum development and *A. litchii* population size. Overall, each erineum stage lasted approximately 50 days. The population size of *A. litchii* increased gradually from stage 01 to stage 02 and stage 03, but a strong decline was observed in stage 04. LT-SEM revealed that erineum density was lower in stage 01 than in the other stages (02, 03, and 04). Different temperatures influenced erineum development and *A. litchii* population size. Erinea developed faster at 35°C than at 15°C, while 25°C appeared to be the optimum temperature for mite development. Mite populations decreased at 35°C, but not at 15°C and 25°C, suggesting that erinea confer protection from low temperatures but not at high temperatures. The possible effects of temperature fluctuations on *A. litchii* will be discussed, aiming at refining monitoring and pest management strategies against this pest.

Keywords: galls, eriophyid, temperature fluctuation, population size, erinea development, phytohormones

 Submitted: 18 Oct. 2022; Accepted by Zhi-Qiang Zhang: 31 Oct. 2022; published: 30 Nov. 2022