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(Coleoptera: Coccinellidae)**

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SHORT COMMUNICATION

First Record of *Hesperomyces virescens* Thaxter (Laboulbeniales: Ascomycetes) on *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae)

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The laboulbenian fungus *Hesperomyces virescens* Thaxter (1891) is reported here for the first time parasitizing the infamous multicolored Asian lady beetle, *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae). Laboulbeniales (Ascomycetes) are obligate parasites of arthropods and receive their nutrition through a haustorium, which penetrates the cuticle (Evans, 1988). Weir and Hammond (1997) demonstrated that among the Insecta a wide range of taxa serve as hosts with approximately 80% of all known Laboulbeniales recorded from Coleoptera. Approximately 25% of the Laboulbeniales have been reported as ectoparasites of Staphylinidae and another 25% attacking Carabidae. In the UK, Weir and Beakes (1996) reported *Hesperomyces virescens* from two species of coccinellids, *Adalia bipunctata* (L.) and *Olla v-nigrum* (Mulsant). The species *H. virescens* is described as one of the few among the Laboulbeniales in which the haustoria form several narrow branches radiating out into the body cavity (Batra, 1979). Kamburov *et al.* (1967) found that *H. virescens* caused premature mortality of the coccinellid, *Chilocorus bipustulatus* L. in Israel where this lady beetle is an important predator of several different citrus scales (Homoptera: Diaspididae).

This paper reports *H. virescens* as a parasite of *Harmonia axyridis* (Pallas), an important lady beetle predator and a noteworthy contaminant of wine. This ladybug caused the demise of hundreds of thousands of liters of wine due to a disagreeable odor and bitter flavor the beetles impart to the wine (Lawrason, 2003; Williams, 2003).

Materials and Methods

Surveys were initiated for monitoring *H. axyridis* during summer 2002 in order to determine their abundance in grapes where their high numbers had caused substantial problems in the two preceding years. These collections were on our campus in Wooster, Ohio and other locations in northeastern Ohio. In addition to grapes, we monitored alfalfa and mung beans weekly. Beetles were collected in grapes and mung beans by brushing them from the plants into a collection container. In alfalfa 100 sweeps were taken with an insect collection net on a weekly basis. The number of beetles were counted, recorded and placed in polypropylene cages.

Field collected ladybugs were stored in a cooler at approximately 20°C until they were transported to the laboratory. They were then examined under a stereoscope to determine sex of the individual (according to drawings by Cristine Nalepa) as well as presence and location of the ectoparasite. SEM technology was used initially for making micrographs used in identification.

Results and Discussion

The Laboulbeniales encountered attacking *H. axyridis* in this study was identified as *Hesperomyces virescens* Thaxter. In our collections we routinely collected the following lady beetles: *Harmonia axyridis*, *Hippodamia convergens* Guérin-Méneville, *H. variegata* (Goeze), *H. parenthesis* (Say), *Coccinella septempunctata* L. and *Coleomegilla maculata* Timberlake. However, only *H. axyridis* was found to be parasitized by *Hesperomyces virescens*.

During the primary grape growing season (July–August) approximately 17% of the *H. axyridis* collected were infected with *Hesperomyces virescens*. Later in the year (September–November), following an aggregation period, 55%–60% of the multicolored Asian lady beetles examined were infected (Table 1).

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Table 1. *Harmonia axyridis* collected in grapes, alfalfa and mung beans infected with *Hesperomyces virescens* Thaxter. OARDC-Wooster, 2002.

	Number of <i>H. axyridis</i> collected		Number of <i>H. axyridis</i> parasitized by <i>H. virescens</i>		Percentage of parasitized		Average % of <i>H. axyridis</i> parasitized by <i>H. virescens</i>
	Female	Male	Female	Male	Female	Male	Males & Females
Jul–Aug	99	100	23	11	23	11	17
Sept	110	200	30	157	27	79	60
Oct–Nov	105	182	21	137	20	75	55

Both sexes of *H. axyridis* were susceptible to the fungus. However, the majority of the parasitism was observed in males (Table 1) and the greater percentage of parasitism was concentrated on the ventroposterior of males and dorsoposterior of females. A lesser degree of infection was found on the legs and prothorax of both sexes. In autumn, after a period of aggregation, during cold weather, infection was generally more conspicuous on the elytra, prothorax and legs (Fig. 1). Developmental stages of the fungus were identified through electron microscopy. SEM magnification revealed the unique morphological characters of this fungus (Fig. 2).

Voucher specimens of the infected insects were sent to the two primary specialists in this fungal group, Alex Weir and Sergio Santamaría.

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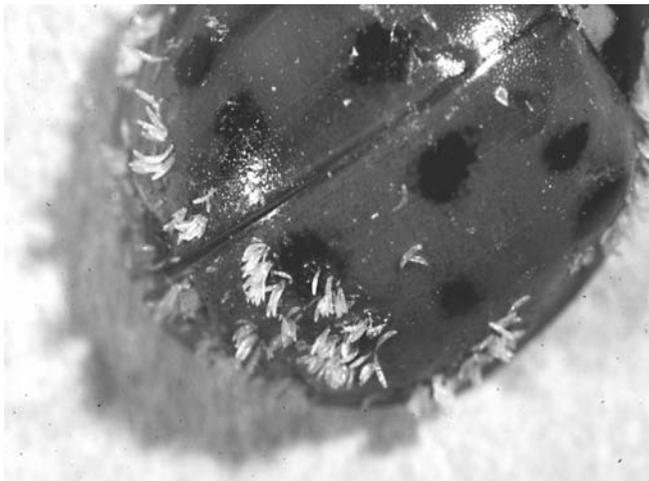


Fig. 1. Adult of *Harmonia axyridis* caught in the late fall with numerous colonies of *Hesperomyces virescens* anchored to its exoskeleton. Heavier infection was noted on beetles caught in the late fall after a period of aggregation.



Fig. 2. SEM of *Hesperomyces virescens* on the integument of *Harmonia axyridis* demonstrating morphological characteristics of the fungus.

Literature Cited

- Evans, H. C. 1988. Coevolution of Fungi with Plants and Animals. Academic Press, San Diego, California. xiv + 652 pp.
- Batra, L. 1979. Insect-fungus Symbiosis, Nutrition, Mutualism, and Commensalism. Allanheld, Osmun & Co. Publishers, New York, New York. vii + 541 pp.
- Kamburov, S. S., D. J. Nadel, and R. Kenneth. 1967. Observations on *Hesperomyces virescens* Thaxter (Laboulbeniales), a fungus associated with premature mortality of *Chilocorus bipustulatus* L. in Israel. Israel Journal of Agricultural Research 17(2):131-134.
- Lawrason, D. 2003. Ontario's Asian Ladybug Tragedy. Wine Access. January 23, 3 pp. www.wineaccess.ca
- Thaxter, R. 1891. *Hesperomyces virescens*. Proceedings of the American Academy of Arts 25:264.
- Weir, A., and P. Hammond. 1997. Laboulbeniales on beetles: host utilization patterns and species richness of the parasites. Biodiversity Conservation 6:701-719.
- Weir, A., and G. Beakes. 1996. Correlative light- and scanning electron microscope studies on the developmental morphology of *Hesperomyces virescens*. Mycologia 88:677-693.
- Williams, R. N. 2003. Multicolored Asian Lady Beetle, *Harmonia axyridis*: new developments in pest management. Viticulture 2:161-163.