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Notes on Eastern North American Butterflies.

Parts by

David J. Hoag, Harry Pavulaan, Brian Taber, Kenneth Lorenzen, Richard D. Ullrich

Editor's Note (HP). New natural history elements and distribution records of several eastern North American butterflies are reported. While diversity and distribution of butterflies in the eastern United States are commonly believed to be fully known, the findings presented here show that much is yet to be learned of our butterfly fauna.

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Lethe eurydice and *L. appalachia* larvae (Nymphalidae: Satyrinae) eat their shed cuticle (exuvia) soon after molting in Vermont, USA

David J. Hoag
173 W. Shore Rd., Grand Isle, VT, USA, 05458

ABSTRACT. Larvae of *Lethe eurydice* and *L. appalachia* were observed eating their newly shed cuticle (exuvia). Further studies are needed to examine the extent of this unique dietary habit within the Satyrinae.

Additional key words: *Lethe eurydice, Lethe appalachia, Lethe anthedon*, larva, instar, molt, cuticle, exuvia.

INTRODUCTION

During previous years of rearing satyrid larvae in Vermont, I noticed some post-molt *Lethe eurydice* larvae ate their shed exoskeleton cuticle (exuvia) prior to consuming their sedge hostplant. Throughout this period, I also reared many *L. appalachia* and *L. anthedon* larvae (Hoag, 2014), but failed to pay close attention to their immediate post-molt activity. Thus, an additional study of this larval behavior was undertaken.

OBSERVATIONS

***Lethe* (*Satyrodes*) *eurydice*:** In the summer of 2020 (July-Sept), thirty *Lethe eurydice* larvae were reared ex ova deposited on some *Carex tuckermanii* sedge plants, which had been transplanted from a drying vernal pool into containers on the author's porch. Without exception, soon after a molt each larva turned around 180^0 and devoured its shed cuticle (**Fig. 1**). Typically a larva consumed its entire cuticle except the head capsule. Thereafter each larva invariably turned around again. One larva upon approaching a newly shed exuvia of another larva started eating the tail. However, this larva soon moved on, leaving most of the cuticle for the previous occupant to eat.

Fig. 1. Series of photos showing a *Lethe eurydice* third instar larva eating its shed cuticle. 5 Aug 2020.

***Lethe* (*Satyrodes*) *appalachia*:** In the summer of 2020 (July-Sept), eight larvae, including a first instar, of *Lethe appalachia* were found on *Carex tuckermanii*, *C. lupulina*, and an unidentified *Carex* species. The first instar was identified as *L. appalachia* by its habitat (Shapiro and Cardé, 1970), a woodland vernal pool, and was differentiated from *L. anthedon* by its dark head capsule. The older *appalachia* larvae were differentiated from *anthedon* larvae by head shape and body stripes. All instars had the same unique dietary habit of consuming their post-molt shed cuticle. (**Fig. 2**).

Fig. 2. *Lethe appalachia* fourth instar larva eating its shed cuticle. 8 Sep 2020.

***Lethe* (*Enodia*) *anthedon*:** In late summer of 2020 (Aug-Sept), seven larvae of *Lethe anthedon* were found on *Carex tuckermanii*, *C. lupulina*, and an unidentified *Carex* species. Since no exuviae were found on the sedges from prior molts, it is proposed that larvae of this species may also consume their post-molt exuviae.

DISCUSSION

Many insects eat their shed cuticle (exuvia) after molting. It is currently believed exuviae-eating allows the insect to recycle nitrogenous compounds contained within the cuticle, such as chitin and specialized proteins (Mira, 2000). Recycling of nutrients obtained from monocotyledons like sedges, is presumably critical to larval growth and survival. Unlike larvae of many other nymphalid subfamilies, *Lethe* larvae have no toxins or irritating hairs or spines to deter predators (Scott, 1986). Removal of the pale-colored exuviae from sedges may lessen the risk of discovery by a predator. Reports of satyrine larvae eating their shed cuticle (exuvia) are unknown to the author. Further studies are needed to examine how common this unique dietary habit is distributed within the Satyrinae.

POST NOTE

Masters (1971) stated, "The foodplant of *Lethe anthedon borealis* is not known …The actual foodplant may prove to be *B. erectum* or another grass, but I would not be suprised [sic] to learn that it was a sedge instead, since several species of sedge are common in the *borealis* habitats."

In 2020, I discovered four late-instar *L. anthedon* larvae on *Carex*, 22-24 May & 2 June, plus five early-instar *anthedon* larvae on *Carex*, September, at a vernal pool. In 2021, I monitored eleven post-diapause *anthedon* larvae on *Carex*, 14-23 May, confirming the acceptance of sedges by this Vermont *anthedon* population as an alternative to grasses as host plant. Late *anthedon* instars turned around to eat their shed exuviae and then turned back to eat sedge, confirming the same unique dietary habit as in *L. eurydice* and *L. appalachia*.

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