N O T E

Laboratory Observations of Red Imported Fire Ant (Hymenoptera: Formicidae) Predation Upon Eastern Tent Caterpillars (Lepidoptera: Lasiocampidae)[1]

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The eastern tent caterpillar, *Malacosoma americanum* (F.), is a common native forest pest in North America (Waage and Bergelson 1985. Am. Midl. Nat. 113: 45-55). Although it is known to feed on many species of native and introduced trees, in South Carolina its primary diet consists of black cherry, *Prunus serotina* (E.). *Malacosoma americanum* usually hatch at the time of *P. serotina* bud break in the early spring (Peterson 1987. Ecol. Entomol. 12: 283-289). Larvae spin a community tent in the spring, composed of discrete concave silk layers varying 2 to 15 mm in depth (Fitzgerald et al. 1983. J. Kansas Entomol. Soc. 56: 20-31).

Tent caterpillars are preyed upon by a variety of predators, including ants (Ayre and Hitchon 1968. Can. Entomol. 100: 823-826), but most have little impact on the population dynamics of the species (Neal et al. 1997. Ann. Entomol. Soc. Am. 90: 596-603). Tents protect caterpillars from tachinid flies and braconid wasps, although stink bugs enter tents to prey on caterpillars (Fitzgerald et al. 1988. Oecologia 76: 574-578). Tent caterpillars reportedly repel the predatory ant, *Myrmica americana* (W.), by regurgitating enteric fluid on attackers (Peterson et al. 1987. Ecology 68: 1268-1272). Enteric fluid produced by larvae fed young leaves is more repellant than that produced by larvae fed mature leaves (Peterson et al. 1987).

A number of studies indicate that red imported fire ants, *Solenopsis invicta* Buren, have the potential for substantial impacts upon lepidopterans in the southeastern U.S. Forys et al. 2001. Florida Entomol. 84: 254-258) reported that *S. invicta* consumed all immature life stages of the giant swallowtail, *Papilio cresphontes* (C.). Fire ants are often dominant ants in the southern U.S., and are known to forage arboreally (Forys et al. 2001). *Solenopsis invicta* was the primary predator implicated in the failure of a phenology study of monarch butterflies, *Danaus plexippus* (L.) (Calvert 1996. J.

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Lepid. Soc. 50: 149-151) and has been implicated in the extinction of the arboreal Florida tree snail (*Orthalicus reses reses* (S.) (Forys et al. 2001. J. Moll. Stud. 67: 369-376). Vogt et al. (2001. Environ. Entomol. 30: 123-128) reported that lepidopteran larvae made up the largest percentage of prey items collected by foraging fire ants. In that study, fire ants protected peanut plants from lepidopteran pod feeders (Vogt et al. 2001).

The impacts of *S. invicta* upon *M. americanum* are not known. The objective of this study was to test the potential vulnerability of tent caterpillars to fire ants. In April 2003, we collected three tents of *M. americanum* larvae from three different *P. serotina* trees at the edge of a road northeast of Clemson, SC, USA. Each of these tents had caterpillars in different stages of development. We also collected three mounds of *S. invicta* from the campus of Clemson University and placed them in 5-L plastic buckets with the upper 10 cm coated with talcum powder to prevent ant escape. On 24 April 2003 at 1630 h, we placed each of the 3 black cherry branches with a tent vertically into the center of a bucket containing a fire ant mound. Fresh cherry leaves were provided to the caterpillars. Each of the tents was at least 0.30 m above the soil in each bucket. We observed larvae from each of the 3 tents periodically over the course of the study to characterize interactions between fire ants and tent caterpillars.

Fire ants were able to successfully penetrate tents and kill the larvae inside. By 1200 h on 25 April 2003, 100% (n = 22) of the caterpillars in the first bucket were dead, and 62% (n = 13) of the caterpillars in the second bucket were dead. By 1400 h, 100% (n = 9) of the caterpillars in the third bucket were dead. By 1430 h on 27 April 2003, 100% (n = 21) of the caterpillars in the second bucket were dead. Some fire ants were observed attacking caterpillars and then falling off the caterpillars and to the soil surface. The actions of fire ants also knocked caterpillars to the soil surface where the caterpillars were attacked and consumed by numerous fire ants. Eight larvae in bucket 2 formed cocoons within their tent. Fire ants chewed through the cocoons, and the pupae inside were consumed, even though these individuals had escaped predation as larvae. This behavior of cocooning inside a tent is unique for *M. americanum,* and may have been a reaction by fully-developed caterpillars to the presence of fire ants.

It has been suggested that aggregations of as few as 20 larvae can have a dramatic effect on survival rates under the threat of predation (Codella and Raffa 1995. Oecologia 103: 24-33). Fire ants were not deterred by aggregated larvae or the nests of the eastern tent caterpillar. Further, neither the pupal phase of the eastern tent caterpillar nor its cocoon provided any protection from fire ants.

Our observations show the potential impact fire ants may have on eastern tent caterpillars. However, these observations were made under laboratory conditions in which the fire ants were provided no alternative prey or food source. If fire ant predation of *M. americanum* occurs in nature, it could have substantial impacts upon the prey's population dynamics. The preferred host plant of *M. americanum* is *P. serotina.* This plant tends to occur in disturbed areas at habitat edges (Tilman 1978. Ecology 59: 686-692). Fire ants also tend to occur in disturbed habitat edges, open fields and pastures, and rarely in canopied, forested or wooded areas (Forys et al. 2001).

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