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ZELIA TRICOLOR (DIPTERA: TACHINIDAE): NEW HOST RECORDS

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The tachinid parasitoid *Zelia tricolor* (Coquillett) has a wide distribution in North America, ranging from Nevada to Pennsylvania, and south to Mexico and Florida (O'Hara & Wood 2004). Coquillett (1899) did not specify a host association when describing the species. Palmer & Tomley (1993) reported *Amniscus perplexus* Haldeman (= *Astylopsis perplexa* (Haldeman)) from *Baccharis halimifolia* L. (Asteraceae) as a host of "*Metadexia* near *tricolor* Coquillett"; a specimen from that study in the National Museum of Natural History, Smithsonian Institution (USNM) confirms that the tachinid is *Zelia tricolor*. Tindall & Fothergill (2010) list *Rhodobaenus* sp. from *Dahlia* sp. stems (citing Wray 1950) and *Dectes texanus* LeConte from soybean (*Glycine max* (L.) Merr.) as *Z. tricolor* hosts. To this list we add the following: *Rhodobaenus quinquepunctatus* (Say) from *Bidens cernua* L. (Asteraceae), *Hippopsis lemniscata* (F.) from *Ambrosia artemisiifolia* L. (Asteraceae), *Oberea tripunctata* (Swederus) from an unknown plant, and *Languria bicolor* (F.) from "*Cacalia*" sp. (Asteraceae; species now included in several genera) (Table 1).

Rhodobaenus quinquepunctatus is a stem boring, univoltine, Curculionidae known from central and eastern North America from Mexico to Canada that overwinters as an adult (Vaurie 1981). The *Rhodobaenus* species noted by Wray (1950) was *R. quinquepunctatus* as it is the only member of the genus found in North Carolina that feeds on *Dahlia* (Vaurie 1981). An additional specimen of *Z. tricolor* found in the USNM from ILLINOIS: Urbana, Aug 26, 1949, is labeled "parasite of *Rhodobaenus tridecempunctatus pulchellus* in stem of *Bidens cernua*." Vaurie (1981) noted that *R. tridecempunctatus* var. *pulchellus* (Gyllenhal) of Blatchley & Leng (1916) actually is *R. quinquepunctatus*, and true *R. pulchellus* does not occur north of Mexico. Thus, this record refers to *R. quinquepunctatus*.

Hippopsis lemniscata is a univoltine cerambycid that primarily utilizes *A. artemisiifolia* as a larval food plant, overwintering as a larva within the stem (Piper 1977; Lingafelter 2007). It is commonly found in the central and southern United States (Lingafelter 2007). Seven *Z. tricolor* adults were reared from 12 *H. lemniscata* larvae harvested from common ragweed stems collected in Pemiscot County, Missouri on 8 Mar 2010, placed on artificial diet (Product #F9703B, Bio-Serv, Frenchtown, NJ) and held in a rearing room at 16:8, 25°C from 9 Mar 2010 to adult emergence. Six *Z. tricolor* were noted as pupae outside their hosts on 3 Apr 2010 and eclosed as adults between 9 Apr 2010 and 11 Apr 2010; the seventh *Z. tricolor* was noted to have pupated outside its host on 9 Apr 2010 and eclosed on 24 Apr 2010. We identified *H. lemniscata* larvae by using Craighead (1923) and by rearing of non-parasitized larvae to adults for identification with Lingafelter (2007). These specimens are housed in the USNM collection.

Oberea tripunctata (Swederus) is a wood boring cerambycid that takes 2 years to complete development to adult in Minnesota (Ruggles 1915). It is widespread in eastern and central North America and larvae bore in living branches of trees and shrubs from many plant families (Lingafelter 2007). A USNM specimen of *Zelia tricolor* from PENNSYLVANIA: Harrisburg, was reared from *O. tripunctata*; no other data were provided on the label.

Languria bicolor is a stem boring languriid and is widespread in eastern and central North America (Vaurie 1948). Although Vaurie (1948) suggests that *L. bicolor* overwinters in the adult stage, they may be plastic in regard to overwintering lifestage as is the congener *L. mozardi* Latreille (Wildermuth & Gates 1920). A specimen of *Z. tricolor* in USNM from MARYLAND: Cabin John Bridge, iss[ued; i.e., eclosed] 5 Sep 1904 also bears a label: "Par: on *Languria bicolor* in *Cacalia*".

Tachinid species are koinobiont endo-parasitoids and typically kill their hosts when completing their development (Stireman et al. 2006). Dissection or rearing of host larvae is the only reliable means of detecting these parasitoids; therefore, elucidating the parasite-host relationship is difficult. Data presented are opportunistic and provide documentation of host-parasite relationships.

Limited data reveal aspects of *Z. tricolor* biology: (1) all known *Z. tricolor* hosts are stem boring beetle larvae; (2) these larvae may or may not be univoltine; (3) *Z. tricolor* can overwinter as larvae within host larvae; (4) *Z. tricolor* is able to find hosts in 2 families of living herbaceous plants and also has the ability to locate hosts (e.g., *Oberea tripunctata*) in a living woody plant; (5) *Z. tricolor* has a 5 (Tindall & Fothergill 2010) to 15-d pupal time under lab conditions after overwintering in

TABLE 1. INSECTS UTILIZED AS LARVAL HOSTS BY *ZELIA TRICOLOR* AND THE PLANTS IN WHICH THEY WERE FOUND.

INSECT				PLANT			
Order	Family	Genus	Species	Family	Genus	Species	Common name
[1]Coleoptera	Curculionidae	*Rhodobaenus*	*quinquepunctatus*[2]	Asteraceae	*Dahlia*	sp.	Dahlia
[3]Coleoptera	Curculionidae	*Rhodobaenus*	*quinquepunctatus*	Asteraceae	*Bidens*	*Cernua*	Nodding Beggartick
[3,4]Coleoptera	Cerambycidae	*Astylopsis*	*perplexa*	Asteraceae	*Baccharis*	*halimifolia*	Eastern Baccharis
[5,6]Coleoptera	Cerambycidae	*Dectes*	*texanus*	Fabaceae	*Glycine*	*Max*	Soybean
[3]Coleoptera	Cerambycidae	*Hippopsis*	*lemniscata*	Asteraceae	*Ambrosia*	*artemisiifolia*	Common Ragweed
[3]Coleoptera	Cerambycidae	*Oberea*	*tripunctata*	Plant not known			
[3]Coleoptera	Languriidae	*Languria*	*bicolor*	Asteraceae	"*Cacalia*"[7]	sp.	

[1]From Wray (1950).
[2]Species not designated by Wray (1950), specimen not examined but identified via host plant association and literature.
[3]USNM specimen.
[4]From Palmer & Tomley (1993).
[5]From Tindall & Fothergill (2010).
[6]Enns Museum specimen.
[7]*Cacalia* species are now contained in several genera; the genera *Arnoglossum* or *Hasteola* are likely candidates.

host Cerambycidae; and (6) there was a 58% parasitism rate within *H. lemniscata*, demonstrating that *Z. tricolor* may have a significant impact on *H. lemniscata* populations (and vice versa). Additional efforts are needed to document other hosts for *Z. tricolor* and to determine its ecological role in shaping stem boring beetle populations.

SUMMARY

New host records are given for *Zelia tricolor* (Coquillett), a tachinid fly that is a parasitoid of stem-boring beetles. New host records are Cerambycidae: *Hippopsis lemniscata* (F.) and *Oberea tripunctata* (Swederus); Curculionidae: *Rhodobaenus quinquepunctatus* (Say); and Languriidae: *Languria bicolor* (F.). The few previously reported hosts of *Z. tricolor* are summarized.

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