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CLOVER STEM BORER, *LANGURIA MOZARDI* (COLEOPTERA: LANGURIIDAE), ON SOYBEANS, *GLYCINE MAX*: A NEW HOST RECORD

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The clover stem borer, *Languria mozardi* Latreille (Coleoptera: Languriidae), is a widespread, native North American beetle (Wildermuth & Gates 1920; Vaurie 1948). The adult feeds primarily on pollen and foliage of its host plant but has been observed feeding on corn silks (*Zea mays* L.) and wheat heads (*Triticum* sp. L.) (Wildermuth & Gates 1920). Larvae tunnel inside the stem of host plants, feeding on the pith and softer inner portions of stem. Stem tunnels can be 75 cm in alfalfa, *Medicago sativa* L. (Wildermuth & Gates 1920). Economic injury to forage crops can result from the tunneling activity of larvae (Wildermuth & Gates 1920) but Folsom (1909) viewed *L. mozardi* as being of secondary importance, if at all, in clover.

*Languria mozardi* is univoltine in the Eastern United States and trivoltine in the South-western United States (Wildermuth & Gates 1920). Overwintering is typically as adults under leaf litter and debris, but overwintering of larvae in stems has been reported (Wildermuth & Gates 1920). Larvae mature within the host stem; pupate in the stem, and adults eclose and spend the first 2-3 d of adult life within the stem (Wildermuth & Gates 1920).

*Languria mozardi* has a wide host range including plants in the families: Asteraceae, Brassicaceae, Campanulaceae, Fabaceae, Malvaceae, Poaceae, and Urticaceae (Folsom 1909; Wildermuth & Gates 1920; Vaurie 1948; Ward et al. 2007). Vaurie (1948) reported a dead adult in the erect stem of a soybean in South Carolina in Nov (no year or date mentioned), but did not list soybean as a larval host plant. Below we present documentation of *L. mozardi* utilizing soybean, *Glycine max* (L.) Merr. as a host plant.

During soybean stem dissection to detect *Dectes texanus* LeConte in Tennessee, Missouri, and Arkansas, we found *L. mozardi* within stems (Table 1). The larva and pupae were reared to adulthood and adults are housed as specimens in the University of Missouri Delta Research Center collection with the exception of record 1 which was documented photographically (Fig. 1). Vaurie (1948) was used to key all adult specimens to *L. mozardi*.

Eggs of *L. mozardi* were not discovered in soybean stems; but it can be assumed that soybean is a larval host based on the biology of stem boring insects and the presence of 1 larva, and pupae and adults in soybean stems. Exit holes smaller than as-

TABLE 1. SPECIMEN DATA FOR *LANGURIA MOZARDI* IN SOYBEAN STEMS.

Record <sup>1</sup>	Harvest date <sup>2</sup>	Date <sup>3</sup>	State	County	Lifestage <sup>4</sup>	Time to adult <sup>5</sup>
1	24 Aug 2007	24 Aug 2007	TN	Dyer	Pupa	not reared
2	20 Oct 2008	3 Nov 2008	MO	New Madrid	Adult	
3	1 Sep 2009	16 Sep 2009	MO	Pemiscot	Pupa	6 d
4	1 Sep 2009	24 Sep 2009	MO	Pemiscot	Adult	
5	1 Sep 2009	28 Sep 2009	MO	Pemiscot	Adult	
6	2 Oct 2009	6 Oct 2009	AR	Crittenden	Pupa	3 d
7 <sup>6</sup>	24 Apr 2009	2 Nov 2009	MO	Pemiscot	Adult	
8	21 Sep 2009	18 Nov 2009	MO	Pemiscot	Adult	
9	15 Oct 2009	15 Oct 2009	MO	Pemiscot	Larva	16 d

<sup>1</sup>Record numbers are for purposes of this paper only.  
<sup>2</sup>Harvest date refers to the date on which the stems were pulled from the field.  
<sup>3</sup>Date is date of initial encounter within soybean stem during processing of sample.  
<sup>4</sup>Life stage found inside soybean stem at initial encounter.  
<sup>5</sup>Time to adult is days post encounter that adulthood was reached in lab and does not represent total generation time.  
<sup>6</sup>This record is of a dead adult from beans planted in 2008.

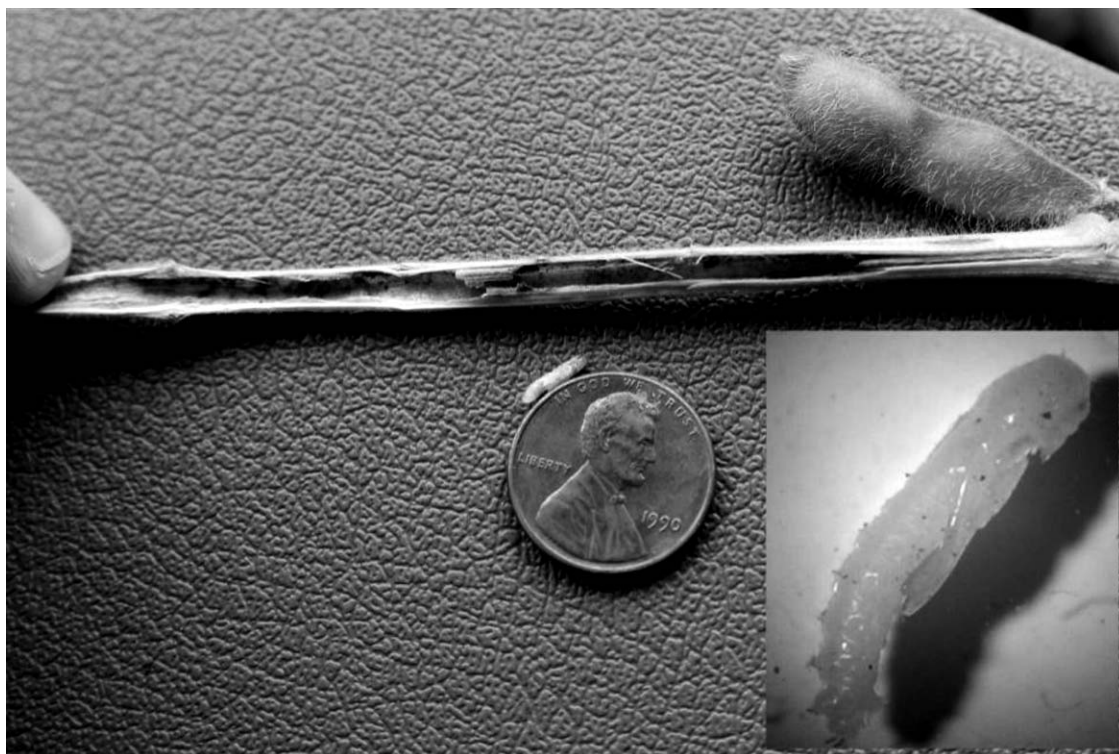


Fig. 1. *Languria mozardi*, pupa with stem, 24 Aug 2007, Dyer County, Tennessee with inset *L. mozardi* pupa removed from soybean stems collected 1 Sep 2009 in Pemiscot County, Missouri.

sociated with *D. texanus* have occasionally been found associated with non-occupied but tunneled soybean stems and may represent *L. mozardi* successfully growing from egg to adult within soybean.

*Dectes texanus* was the only insect commonly recognized as stem boring in soybean stems in the mid-south. Genung & Green (1965) reported 4 soybean stem boring insects in the Florida everglades, one of which was *Languria* sp. (possibly *L. marginipennis* (Sz.)) boring in leaf petioles with a mention that a related species (presumably *L. mozardi*) is a pest of other legumes. The presence of this second stem-boring species within mid-south soybeans mandates careful identification of beetle larvae encountered to assign stem damage to the proper insect.

As a result, tunneled, but unoccupied, soybean stems in the midsouthern United States can not be assumed to be from *D. texanus* tunneling. *Dectes texanus* is a large, univoltine insect that overwinters as a larva within the soybean stem (Hatchett et al. 1975). *Languria mozardi* is a smaller, possibly multivoltine insect that typically overwinters as an adult outside of the soybean stem (Wildermuth & Gates 1920). These differences in biology lead to differences in how stems are tunneled. Sample size is small, but it appears that *L. mozardi* tunnels are less exten-

sive with finer frass than those of *D. texanus*. Additionally, *D. texanus* makes an overwintering chamber 5-7 cm above the soil surface in the soybean stem (Hatchett 1975) with a frass plug positioned below a girdled spot where the stem will potentially lodge; *L. mozardi* does not do this. Post-harvest sampling of soybean stubble will likely only reveal *D. texanus* larvae and/or overwintering chambers as demonstrated by the 479 larvae from post-harvest soybeans reared to adulthood by Tindall et al. (2009).

Based on limited observations and known biology, it is anticipated that soybean stem surveys earlier in the season could detect greater numbers of *L. mozardi*. Expanding the geographical range of soybeans as a larval host of *L. mozardi* is also likely if the search area is expanded, because both *L. mozardi* and soybeans are widely distributed within North America. It is not known if soybeans are utilized by 1 or 3 generations of *L. mozardi* and if stem tunneling is more common in younger or older plants. At this time, the authors do not think *L. mozardi* has an economic impact on soybean production. *Languria mozardi* has a wide host range and preference among hosts is not known. It is unknown if there are any interactions between *D. texanus* and *L. mozardi*. Future work is needed to explore these questions.

## SUMMARY

*Languria mozardi* larva, pupae and adults were recovered from soybean stems during stem dissections to detect *Dectes texanus* in Arkansas, Missouri, and Tennessee demonstrating that soybean is an acceptable host plant. This is the second native stem boring insect to adopt the introduced soybean as a larval host in the mid-southern United States.

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