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Three new host plants of *Edessa loxdalii* (Hemiptera: Heteroptera: Pentatomidae) and notes on its rearing in the laboratory

Tiago Lucini¹ and Antônio R. Panizzi^{2,*}

The subfamily Edessinae (Hemiptera: Heteroptera: Pentatomidae), which is supported by several characteristics (Barcellos & Grazia 2003; Fernandes 2010), contains various groups of species (Fernandes & van Doesburg 2000; Fernandes & Campos 2011; Silva & Fernandes 2012). Among these groups, the highly speciose genus *Edessa* comprises an enormous number of described (291) (www.insectoid.info/taxo.php) and undescribed (>300) species (J.A.M. Fernandes, personal communication to A.R.P.). Among them, there are well studied species, such as the so-called (in Brazil) brown-winged stink bug *Edessa meditabunda* (F.), mostly reported as a pest of soybean, sunflower, and potato (Rizzo 1971; Galileo & Heinrichs 1979; Panizzi & Machado-Neto 1992), but also feeding on vegetables (Krinski et al. 2012). However, most of the species of *Edessa* are poorly studied, and their host plants are unknown.

During Sep–Dec 2014, and on 22 Mar 2015, on 4 occasions, nymphs and adults of a species of *Edessa* were observed and collected on 3 plant species in Francisco Beltrão, Paraná State, Brazil (26.0808333°S, 53.0547222°W). Insects captured in 2014 were taken to the laboratory at the Embrapa Unit at Passo Fundo, RS, Brazil (28.2500000°S, 52.4000000°W). They were placed in clear plastic rearing boxes (25 × 20 × 20 cm) lined with filter paper and provided with pods of green bean, *Phaseolus vulgaris* L. (Fabales: Fabaceae), raw shelled peanut, *Arachis hypogaea* L. (Fabales: Fabaceae), mature seeds of soybean, *Glycine max* (L.) Merrill (Fabales: Fabaceae), and fruits (berries) of privet, *Ligustrum lucidum* Aiton (Lamiales: Oleaceae). This mixture of foods is routinely used to keep colonies of stink bugs in our laboratory. Boxes were kept in a walk-in chamber at 25 ± 1°C temperature, 65 ± 5% RH, and a photoperiod of 14:10h L:D.

The insects were sent for examination and were identified as *Edessa loxdalii* Westwood. Nymphs and adults (Fig. 1) were captured colonizing plants of soybean, oriental raisin tree, *Hovenia dulcis* Thunb. (Rosales: Rhamnaceae), and plants of a wild solanaceous shrub *Solanum corymbiflorum* (Sendtn.) Bohs. (Solanales: Solanaceae), these last plants located in the border of an area covered with natural vegetation. On all 3 species of host plants, nymphs and adults were observed to feed on stems and leaves. Species of *Edessa* are known to feed on stems or on leaf veins of their host plants. This behavior is documented for *E. meditabunda* on soybean (Galileo & Heinrichs 1979; Panizzi & Machado-Neto 1992; Silva et al. 2012). From the colony established in the laboratory, nymphs and adults were observed to feed mostly on the green bean pods and on the stems of privet branches holding the berries that were used in the

rearing boxes. It was interesting that on privet, whereas most pentatomids that we normally rear in the laboratory feed on the berries, *E. loxdalii* preferred the stems.

Data on reproduction, nymph development time, and survivorship to the 2nd instar of the insects collected in 2014 on soybean and on the wild solanaceous plant are presented in Table 1. Adults were fed in the laboratory on the mixture of foods previously described. Females laid eggs, and nymphs obtained survived to the adult stage, taking approximately 60 d to complete development; however, mortality was high, and over 30% of the nymphs were dead before reaching the 3rd instar. Because we did not keep records on individual nymphs, we are unable to provide data on survivorship and development time for each instar and from 2nd instar to adult.

Nymph mortality is usually high for species of *Edessa* reared in the laboratory. For example, nymphs of *E. meditabunda* reared in the laboratory on soybean and sunflower leaf/stem showed mortality ≥80% (Panizzi & Machado-Neto 1992); mortality on green bean pod was 81% (Sánchez et al. 1999); for *Edessa* aff. *aulacosterna* Stål feeding on branches and buds of the Amazonian camu camu, *Myrciaria dubia* (Kunth) McVaugh (Myrtales: Myrtaceae), mortality was 98% (Iannaccone et al. 2007). The relatively long development time of nymphs might be attributed to the fact that they fed on stems, most likely on xylem vessels, which are low in nutrients. Another species, *E. meditabunda* is also known to feed on xylem (Lucini & Panizzi 2016), and its development time is usually longer (48–73 d [Rizzo 1971]; 50–96 d [Gonçalves et al. 2008]) compared with that of other phytophagous stink bugs that feed on seeds (<40 d) (see references in Panizzi 1997). For *E. aff. aulacosterna* feeding on branches and buds of the Amazonian camu camu, nymph development (egg to adult) required 119 d (Iannaccone et al. 2007).

Little information was found in the literature regarding *E. loxdalii*. The species is reported to occur in Guyana (as British Guiana) (Kirkaldy 1909), Suriname (Kastelein 1985), and Costa Rica (http://boldsystems.org/index.php/Taxbrowser_Taxonpage?taxid=478529). It is reported to transmit *Phytomonas* sp. (Trypanosomatida: Trypanosomatidae) to the palm tree known as embauba, *Cecropia palmata* Willd. (Rosales: Urticaceae), native to Central and South America and the West Indies, and possibly to coconut, *Cocos nucifera* L. (Arecales: Arecaceae) in Suriname (Kastelein 1985). These 2 palm species are the only records on associated plants that we found in the literature for *E. loxdalii*. However, despite its transmission of trypanosomatid parasites to the plants, it is not clear if the insect is able to reproduce on them or not.

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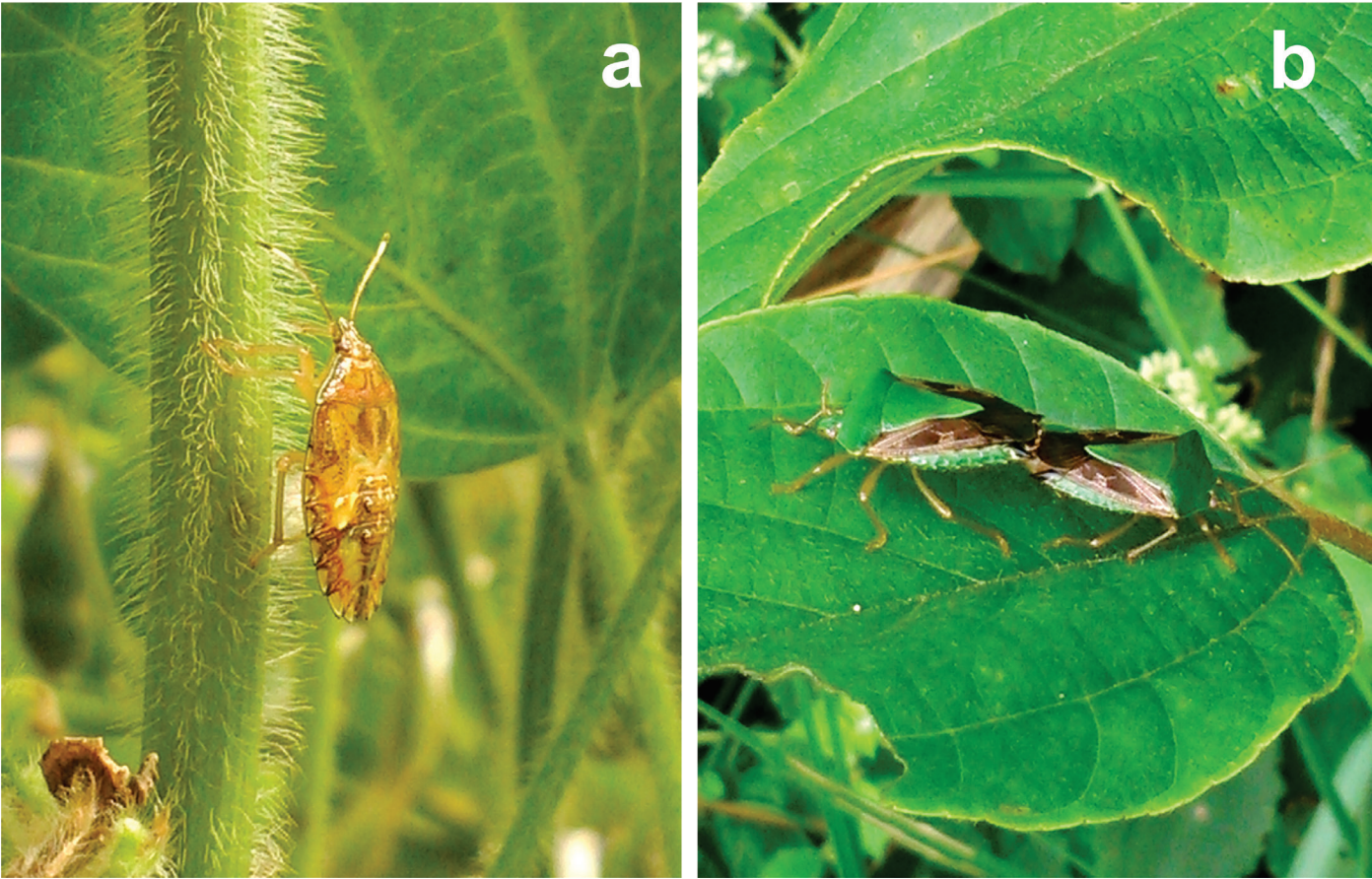


Fig. 1. *Edessa loxdalii* nymph on soybean stem (a) and copulating adults on leaf of oriental raisin tree (b).

In Brazil, the only record we found in the literature is by Grazia & Schwertner (2011), who mentioned that *E. loxdalii* occurs in São Paulo State, but they gave no host plants. Apparently, because of its limited economic importance, this species has not been investigated much, and its host plants are unknown, despite its possible general distribution in the country.

In conclusion, *E. loxdalii* apparently feeds and reproduces on the 3 host plants on which they were intercepted, because nymphs and adults were found on the plants. The wild *S. corymbiflorum* is not common, but as *Edessa* species are known to prefer solanaceous plants, it might be one of *E. loxdalii*'s preferred host plants. Soybean covers huge areas nearby the site where the insects were observed, and therefore this plant is located easily by them; *Edessa* species also are known to prefer plants of the family Fabaceae. The oriental raisin tree might

have attracted *E. loxdalii* to feed on the abundant buds, where most nymphs were found. In the laboratory, nymphs completed development and adults reproduced on the food mixture provided (described above), which is routinely used to rear several species of stink bugs. Thus, *E. loxdalii* likely is polyphagous and therefore has flexibility to adapt to alternate food sources.

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Table 1. Host plants of *Edessa loxdalii* field-collected in Francisco Beltrão, PR, Brazil, in 2014 and 2015, and biology data obtained in the laboratory.

Date collected	Host plant	Number collected		Number of egg masses laid (eggs/mass) [total eggs] ^a	Nymph emergence, survivorship to 2nd instar ^a (%)	Development time (egg to adult) (d) ^a
		Nymph	Adult			
6 Sep 2014	<i>Solanum corymbiflorum</i>	12	0	13	70.8	50–60
5 Oct 2014	<i>Solanum corymbiflorum</i>	2	5	13–14 ^b	63.8	no data
23 Dec 2014	<i>Glycine max</i>	31	8	[168]	no data	no data
22 Mar 2015	<i>Hovenia dulcis</i>	42	19	no data	no data	no data

^aData from insects feeding on the mixture of foods provided in the laboratory (insects captured on the first 3 dates of collection).
^bOne egg mass had 4 eggs, which was considered an abnormal event.

Summary

The poorly known stink bug, *Edessa loxdalii* Westwood (Hemiptera: Heteroptera: Pentatomidae) was intercepted in Francisco Beltrão, Paraná State, Brazil (26.0808333°S, 53.0547222°W) feeding and reproducing on soybean, *Glycine max* (L.) Merrill (Fabales: Fabaceae), on oriental raisin tree, *Hovenia dulcis* Thunb. (Rosales: Rhamnaceae), and on the wild solanaceous plant *Solanum corymbiflorum* (Sendtn.) Bohs. (Solanales: Solanaceae). Preliminary data obtained in the laboratory on a mixture of natural foods indicated a delayed development time and high nymphal mortality.

Key Words: Insecta, Edessinae, Neotropics, biology

Sumário

O percevejo pouco conhecido, *Edessa loxdalii* Westwood Westwood (Hemiptera: Heteroptera: Pentatomidae) foi capturado em Francisco Beltrão, Estado do Paraná, Brasil (26.0808333°S, 53.0547222°W) alimentando-se e se reproduzindo em soja, *Glycine max* (L.) Merrill (Fabales: Fabaceae), em uva do Japão, *Hovenia dulcis* Thunb. (Rosales: Rhamnaceae) e na solanácea selvagem *Solanum corymbiflorum* (Sendtn.) Bohs. (Solanales: Solanaceae). Dados preliminares obtidos em laboratório usando uma mistura de alimentos naturais indicaram um desenvolvimento ninfal prolongado e uma mortalidade ninfal alta.

Palavras Chave: Insecta; Edessinae; neotrópicos; biologia

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