

SELECTION OF RESTING SITES OF *TRITOMA GERSTAECKERI* (STAL) (HEMIPTERA: REDUVIIDAE) FEMALES UNDER LABORATORY AND FIELD CONDITIONS

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Torres-Estrada, J.L., J.A. Martínez-Ibarra y J.A. García-Pérez. 2002. Selection of resting sites of *Triatoma gerstaeckeri* (Stal) (Hemiptera: Reduviidae) females under laboratory and field conditions. *Folia Entomol. Mex.* 41(1): 63-66.

ABSTRACT. A study to corroborate the preference among resting sites by *Triatoma gerstaeckeri* (Stal) females and the influence of feeding status on that selection was carried out under laboratory and field conditions. Females selected only soil and block walls as resting sites, with no significant ($P > 0.05$) differences between them, under laboratory and field conditions. Most starved females climbed significantly ($P < 0.05$) higher heights than fed females, under laboratory and field conditions. A description of preferred resting sites is provided for enhancing vector control in Northeast of Mexico.

KEY WORDS: *Triatoma gerstaeckeri*, resting sites, laboratory, field conditions.

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RESUMEN. Se realizó un estudio con la finalidad de corroborar las preferencias previamente observadas en la selección de los sitios de reposo de hembras de *Triatoma gerstaeckeri* (Stal), así como la influencia del estado alimenticio en tal selección, bajo condiciones de laboratorio y campo. Las hembras eligieron únicamente el suelo o las paredes de block como sitio de reposo, sin diferencias significativas ($P > 0.05$) entre cada sitio, bajo condiciones de laboratorio y campo. Las hembras ayunadas subieron a alturas significativamente ($P < 0.05$) mayores en las paredes, respecto de las hembras alimentadas; bajo condiciones de laboratorio y campo. Con base en los resultados obtenidos, se puede concluir que las descripciones de las preferencias de los sitios de reposo pueden contribuir a mejorar las medidas de control de *T. gerstaeckeri*.

PALABRAS CLAVE: *Triatoma gerstaeckeri*, sitios de reposo, laboratorio, campo.

In Mexico, the current situation of vectors of Chagas disease is unknown, since only recently the Mexican Sanitary Bureau have begun to recognize it as a public health problem. Research

about Mexican triatomines has been mainly focused on vector infection by *Trypanosoma cruzi* (Chagas), Chagas disease agent (Zárate and Zárate, 1985; Velasco-Castrejón, 1991;

Magallón-Gastélum *et al.*, 1998; Martínez-Ibarra *et al.*, 2001), in consequence, scarce research have been developed on behavior of these vectors (Zárate, 1983; Zárate *et al.*, 1984, Galavíz-Silva *et al.*, 1991a; Malo *et al.*, 1993; Martínez-Ibarra and Kathhain-Duchateau, 1999).

Nine *Triatoma* species are considered as the most important vectors for Chagas disease in Mexico (Velasco-Castrejón *et al.*, 1994), among them, *T. gerstaeckeri* (Stal) is the most important vector in the Northeast states of Mexico, because of its dispersion, high Natural Infection Indicators and contact with human populations (Zárate and Zárate, 1985; Galavíz-Silva *et al.*, 1991b; Vázquez-Figueroa *et al.*, 1991; Martínez-Ibarra *et al.*, 1992; Vidal-Acosta *et al.*, 2000). This species has been collected from block walls (even higher than two m height), soil, mice and rat shelters, spiderwebs, sleeping rooms and stones in the peridomiciliary area in some localities of Nuevo Leon, Mexico (Galavíz-Silva *et al.*, 1991b; Vázquez-Figueroa *et al.*, 1991; Martínez-Ibarra, 1992). Considering previous data, a study was developed to confirm the preferences of *T. gerstaeckeri* to previously recorded resting sites, to clarify the influence of feed status on resting sites preferred by *T. gerstaeckeri* females, and to confirm its previously recorded habit of climbing walls. These data could increase the efficiency of control campaigns and reducing in consequence, vector-human contact.

MATERIAL AND METHODS

Laboratory conditions. Research work was partially carried out in the Laboratory of Medical Entomology, in the School of Biology, at the University of Nuevo Leon, México. For laboratory work, an observation cube of 1.5 x 1.5 m using glass covered with Bristol board to make it light-proof and steel was built. Typical conditions, similar to houses where this species had

been previously collected, were provided. Three block walls and a cardboard wall were built. Two plastic tubes (10 cm of diameter and 1 m long) were "connected" to the floor of the cube and provided with a mouse on each one. A mesh prevented mice escape and damage to triatomines. Some sand (collected from field on the experimental area) was used to slightly cover the floor.

Field conditions. Field work was carried out in a typical house of San Juan de Vaquerías village, Nuevo León, México (25° 15' N., 99° 12' W.). These houses are usually 10 x 10 x 3 m, built on block, soil of dust, palm roofs and some free rats and mice inside (about 10-15 were observed on most of the houses under a different study; Martínez-Ibarra 1992). The selected house to develop this research was used by inhabitants as a warehouse, however, an empty room was used to develop the experiment, to avoid bias.

Releasing methods. A four-month old group of 120 *T. gerstaeckeri* adult females (60 fed and 60 starved) (Table 1) was used for this study. This group was the fifth generation of a laboratory colony started with some adults collected in San Juan de Vaquerías, Nuevo León. Prior to experiments, all females were starved for a month, and 60 females were fed on mice blood and 60 were kept unfed on the days of experiments. We performed six replicates, each involving 10 insects. Each experiment was developed beginning about 21:00 and finishing about eight hours later. It was selected the time of day when this species is more active (Martínez-Ibarra 1992). On each environment (lab or field), each single female was released on the center of the place (glass cube or house) and visually followed by eight hours to record the selected resting sites and the climbed heights. Selected resting sites were considered those where females stayed for at least 20 minutes. Differences between

resting sites and climbed heights were tested by chi square (X^2).

RESULTS

Triatoma gerstaeckeri females selected only soil and block walls as resting sites, with no sig-

nificant ($P > 0.05$) differences between them under laboratory and field conditions. Most starved females climbed higher than 75 cm height, whereas most fed females stayed no higher than 10 cm height (Table 1).

Table 1
Resting sites chose by *Triatoma gerstaeckeri* females under laboratory and field conditions

Physiological stage	Resting sites (%)				Shelter with mouse
	Soil	Block wall		Cardboard wall	
		Upper half	Lower half		
Fed ¹	70	3.3	26.7	0	0
Starved ¹	35	60	5	0	0
Fed ²	75	5	20	0	0
Starved ²	20	73.3	6.7	0	0

¹Laboratory conditions; ²Field conditions.

DISCUSSION

Triatoma gerstaeckeri females used only soil or block walls as resting sites under laboratory and field conditions, similar to previously studied fed *T. pallidipennis* adults (Torres-Estrada *et al.*, 1992) and to fed fifth instar nymphs of *T. gerstaeckeri*, but different to starved ones, which selected mouse shelters (Torres-Estrada and Martínez-Ibarra, 1993). In both cases, females looked for a resting place instead of looking for a source of food, in contrast to starved fifth instar nymphs (Torres-Estrada and Martínez-Ibarra, 1993) since previous studies have shown that these species females are not as "aggressive" (Galavíz-Silva *et al.*, 1991a; Martínez-Ibarra *et al.*, 1992) as fifth instar nymphs. As shown, *T. gerstaeckeri* females chooses the first available refuge to escape from predation, as *T. infestans* in Argentina (Wisnivesky-Colli *et al.*, 1995). All females selected soil or block walls as resting sites, similar to *T. pallidipennis* and to fed fifth *T. gerstaeckeri* nymphs (Torres-Estrada *et al.*, 1992; Torres-Estrada and Martí-

nez-Ibarra, 1993). Soil is not a good shelter to protect triatomines females from predation, however, fed females could have selected it because of their weights, that increase difficulties on climbing. Starved females mostly selected block walls maybe because it is easier climbing block walls because of its shape and climbing preserve them from predation, as *T. infestans* do it in Argentina (Wisnivesky-Colli *et al.*, 1995).

This current study confirms the role of block walls as resting sites for *T. gerstaeckeri* females, as well as the preference of fed females for resting on the soil. Although experimental conditions are only limited approximation to those found in nature, they show some interesting aspects of triatomine interactions that are difficult to derive from field observations alone. Observation of local ecological conditions will indicate which laboratory results are meaningful, and additional experimental studies are necessary to disclose the physiological and behavioral features of triatomines that are relevant in the coloni-

zation and distribution on the domiciliary habitat. Besides that, description of preferences on rest sites of triatomines could let implement limited and focused sprays contributing to improve vector control campaigns in this area of Mexico.

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Recibido: 28 de mayo 2001.

Acceptedo: 21 septiembre 2001.