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SCIENTIFIC NOTE

UPDATE ON THE BIOLOGY OF *TRIATOMA DIMIDIATA* LATREILLE (HEMIPTERA: REDUVIIDAE) UNDER LABORATORY CONDITIONS

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ABSTRACT. Feeding time, postfeeding defecation delay, and life cycle for each stage of a cohort of recently colonized Mexican *Triatoma dimidiata* were evaluated, and results were compared to existing published information on this species. Seventy-five nymphs (41.7%) completed a cycle with an average time from N-I to adult of 142 ± 64 days. The average span in days for each stage was 20.2 for N-I, 17.9 for N-II, 10.1 for N-III, 43.6 for N-IV, and 55.1 for N-V. First-stage nymphs had the highest mean feeding time (25 min) and the longest postfeeding defecation delay (45 min). Differences among biological data from previous studies and the present study confirm the importance of conducting research on the behavior of the indigenous triatomine species from various countries.

KEY WORDS *Triatoma dimidiata,* Reduviidae, Chagas disease

Six species of *Triatoma* are considered important as vectors of Chagas disease in Mexico. Of these, *Triatoma dimidiata* Latreille is the most common, occurring in homes and chicken roosts in the villages of 16 states (50%) of central, western, southern, and southeastern Mexico (Zárate and Zárate 1985, Guzmán-Marín et al. 1991, Vidal-Acosta et al. 2000). The biology and behavior of *T. dimidiata* have been studied previously with specimens from Costa Rica (Zeledón et al. 1970, 1977). However, because of the high variability in behavior observed in this species among different habitats in Mexico, a comparison of published biological data from Costa Rican specimens was made with data from recently colonized Mexican *T. dimidiata* specimens.

A laboratory colony established in 1998 from bugs captured in Nueva America, Huixtla, Chiapas, was used. The colony was maintained at 27.3 ± 3°C and 65 ± 10% relative humidity (RH) and was fed every 7 days on immobilized rabbits. Eggs were grouped by date of oviposition to initiate a cohort of 180 eggs. Three days after eclosion, the nymphs were individually offered a meal on an immobilized New Zealand rabbit for a 1-h period, followed by a feeding every 7th day. The bugs were maintained in a dark incubator at 27 ± 3°C and 65 ± 5% RH, and were checked daily for ecdysis or death. Nymphs were observed from blood-meal exposure through 1 h after feeding. Feeding time and time between blood meal and defecation were recorded.

Seventy-five nymphs completed development to the adult stage (34 males and 41 females). The average egg-to-adult development time was 161.7 days (range 88–325 days; Table 1). Mean bloodfeeding time did not differ significantly ($P > 0.05$) among nymphal stages (Table 2). Likewise, the mean time between bloodfeeding and defecation did not differ significantly ($P < 0.05$) among the 2nd through 5th nymphal stages. However, this time for 1st-stage nymphs was significantly different from all other stages (Table 2).

The developmental cycle of triatomines varies according to species, environmental conditions, and especially the availability of blood sources (Schofield 1985). The average development time of *T. dimidiata* in this study (161.1 ± 7.4 days) fed weekly on rabbits and maintained at 27 ± 3°C, 65 ± 5% RH was shorter than those for *T. dimidiata* in a previous study in Costa Rica (332 days, range 257–411 days, maintained at 24.4–21.8°C, 75% RH; 252.9 days, range 180–285 days, maintained at 26.5°C, 45–55% RH) fed weekly or every 3 wk on rabbits. However, the Costa Rican triatomines were from a colony established from insects captured under very different environmental conditions (Zeledón et al. 1970). Developmental times in our studies were similar to those for *Triatoma pallidipennis* (Stal) (168.7 ± 11.71 days) fed every 3 days on hens and maintained at 25 ± 4°C and 60 ± 10% RH (Martínez-Ibarra and Katthain-Duchateau 1999). Developmental time was less for *Triatoma infestans* (Klug) (141 days) fed weekly on hens and maintained at 26 ± 1°C and 60 ± 10% RH (Rabinovich 1972), and for *T. barberi* Usinger (143.7 days for females and 205.3 days for males) fed every 4.2 days on rabbits and maintained at 27°C and 60 ± 10% RH (Zárate et al. 1984). The mean feed-

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Table 1. Egg-to-adult developmental cycle of *Triatoma dimidiata,* fed every 7 days on rabbits.

		Duration in days		
Stage	Number	Minimum	Maximum	Mean ± SD
Egg to N-I	120	14	23	19.1 ± 3.1
N-I to N-II	106	9	45	20.2 ± 11.4
N-II to N-III	96	11	43	17.9 ± 9.2
N-III to N-IV	88	12	50	10.1 ± 8.9
N-IV to N-V	81	24	64	43.6 ± 11.3
N-V to adult	75	18	100	55.1 ± 19.9
Total	75	88	325	161.7 ± 10.7

ing times on *T. dimidiata* were similar to those for *Rhodnius prolixus* Stal and *T. infestans* (Zeledón et al. 1977) and for *T. barberi* (Zárate 1983). Feeding times are epidemiologically important in Chagas disease vectors because longer feeding periods increase the risk of host infection by *Trypanosoma cruzi.* Mean postfeeding defecation delays were significantly longer ($P < 0.05$) in *T. dimidiata* than those for *T. pallidipennis* (Martínez-Ibarra and Katthain-Duchateau 1999), and for *R. prolixus* and *T. infestans* (Zeledón et al. 1977). These data on defecation patterns demonstrate that most stages of *T. dimidiata* are potential vectors of *T. cruzi.* Postfeeding defecation times longer than 10 min are considered to be associated with low transmission rates of *T. cruzi* (Zárate et al. 1984; Gonçalves et al. 1988, 1997) because of a reduced likelihood of fecal contamination to vertebrate hosts. Most findings from this research agree with results from the Costa Rican study, where only females and 5th-stage nymphs were considered to be effective vectors of *T. cruzi* (Zeledón et al. 1977).

Important differences were found between our biological data and those from studies with Costa Rican bugs. This supports the importance of conducting research on the behavior of indigenous triatomine vectors from different countries.

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Table 2. Mean feeding times and postfeeding defecation delay in *Triatoma dimidiata* under laboratory conditions.

		Mean feeding time (min)			Defecation delay (min)		
Stage	n	Minimum	Maximum	$\bar{x}$ ± SD	Minimum	Maximum	$\bar{x}$ ± SD
First	120	22	29	25 ± 2	39	51	45 ± 6
Second	106	17	26	21 ± 4	11	32	21 ± 10
Third	96	14	25	19 ± 6	15	30	22 ± 6
Fourth	88	13	20	15 ± 3	13	31	21 ± 8
Fifth	81	12	26	19 ± 8	17	29	22 ± 6
Female	41	10	21	15 ± 5	15	25	20 ± 6
Male	34	9	20	14 ± 5	14	27	21 ± 7