

HOST FEEDING PROFILES OF *TRITATOMA DIMIDIATA* IN PERIDOMESTIC HABITATS OF WESTERN PANAMA

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Abstract. Bloodmeal analysis of *Triatoma dimidiata* collected in peridomestic habitats of western Panama showed that avian feedings comprised 25% of this species' host selections; opossums, the principal reservoir of Chagas' disease in the republic, were not among mammalian feedings. These findings may account for the low infestation rates of *Trypanosoma cruzi* in the bugs and the hypoendemicity of Chagas' disease in western Panama.

In 1960 a World Health Organization committee estimated that about 7 million persons were infected with Chagas' disease in Latin America.¹ More recent estimates indicate that between 13 to 14 million persons currently are suffering from the disease.² Based primarily on serological evidence, Sousa³ estimated that approximately 40,000 persons are infected with *Trypanosoma cruzi* in Panama.

Two of the 10 triatomine species indigenous to Panama,⁴ *Rhodnius pallescens* and *Triatoma dimidiata*, have been incriminated as the principal vectors of *T. cruzi* in central and western regions of the country, respectively.

Over 5,000 triatomines have been collected from domestic and peridomestic sites in central Panama, the most populated area of this country. About 99% of the bugs collected in this region were *R. pallescens*, and approximately 62% of these were infected with *T. cruzi*.⁵

Pipkin reported *T. cruzi* infections in 41 of 128 opossums (*Didelphis marsupialis*) collected in peridomestic sites in central Panama, and he considered this animal as a principal reservoir link between sylvatic and domestic cycles of Chagas' disease.⁶ Edgcomb and Johnson⁷ reported *T. cruzi* infections in 57 of 100 *Rattus rattus* collected in and around buildings in central Panama, implicating this rodent as an important domestic reservoir of Chagas' disease in this area.

Christensen and Vasquez⁸ determined the feeding patterns of 288 *R. pallescens* collected from domestic habitats in three rural commu-

nities of central Panama, El Aguacate, Cauchal, and Filipina. Microcapillary precipitin tests showed the principal hosts were humans (59%), opossums (17%), pigeons/doves (6%), chickens (5%), and murid rats (2%).

The present study concerns the feeding habits of *T. dimidiata* in the western province of Chiriqui. It is the second most common triatomine species in Panama, after *R. pallescens*, and occurs throughout the Republic. *T. dimidiata* reaches its highest population densities in the province of Chiriqui, where *R. pallescens* has not been reported. *T. cruzi* infestations in *R. pallescens* from five regions in central Panama ranged from 56.1% to 80.3% (mean 61.5%), whereas infection rates in *T. dimidiata* from western Panama averaged 13.5%.⁵ *T. cruzi* was isolated by hemoculture from 2.7% of 7,099 people tested in the central provinces of Panama and Colon, but trypanosomes were not detected in the blood of 1,016 persons tested in the western province of Chiriqui⁹ (Fig. 1). The present study was initiated to determine if the feeding habits of *T. dimidiata* may contribute to the low infestation rate in the bugs and lack of clinical evidence of Chagas' disease in humans in western Panama.

MATERIALS AND METHODS

A total of 631 *T. dimidiata* nymphs and adults was collected by local residents inside and around the houses, in storerooms and porches from 20 communities in Chiriqui Province. When in storerooms, bugs were generally associated with wood piles and storage. Some of the triatomines have been collected near resting places for humans and dogs, and children were reported bitten



FIGURE 1. The provinces of Panama. *T. dimidiata* collections were conducted in 20 localities from the western province of Chiriquí.

by the bug. The triatomines were placed individually in glass vials, which were labeled with the date, collection habitat, and locality, and transported to the Gorgas Memorial Laboratory for identification and analysis for host determinations by the capillary precipitin test. The preparation of antisera and processing the blood-meals via the precipitin test has been reported previously.⁸

RESULTS

Three hundred twenty-six of the 631 bugs collected contained sufficient blood to determine their hosts, to the family level of specificity in most cases. *T. dimidiata* was found to feed on the following hosts (in decreasing order of frequency): humans (38%); chickens (19%); dogs (17%); and 11 other mammalian, avian, and amphibian taxa (Table 1). Feeding on members of two host families was detected in 35 (11%) of the specimens and three host families in one specimen, resulting in a total of 363 bloodmeals. Opossums, the principal reservoir of Chagas' disease, and the host most frequently fed on besides humans by *R. pallescens* in domestic and peridomestic habitats in central Panama, was not fed on by *T. dimidiata* in the present study.

DISCUSSION

Most of the houses visited in Chiriquí were constructed of wood, had cement floors, metal or tile roofs, and glass-pane windows which made invasion by triatomines difficult. This differs markedly from houses in rural areas of central Panama, many of which have cane walls, palm-

TABLE 1

Hosts of T. dimidiata collected from peridomestic habitats in western Panama identified by capillary precipitin analysis

Host	No. of blood-meals	% of class	% of total
Mammalia	268	100.0	73.8
Undetermined	20	7.5	5.5
Primates			
Undetermined	6	2.2	1.7
Hominidae (human)	137	51.1	37.7
Carnivora			
Undetermined	5	1.9	1.4
Canidae (dog, fox)	62	23.1	17.1
Felidae (cat)	5	1.9	1.4
Rodentia			
Undetermined	4	1.5	1.1
Cricetidae (rice rat)	1	0.4	0.3
Muridae (roof rat)	5	1.9	1.4
Lagomorpha			
Leporidae (rabbit)	11	4.1	3.0
Artiodactyla			
Bovidae (cow)	12	4.8	3.3
Aves	91	100.0	25.1
Undetermined	11	12.1	3.0
Galliformes			
Phasianidae (fowl)	69	75.8	19.0
Psittaciformes			
Psittacidae (parrot)	5	5.5	1.4
Falconiformes			
Accipitridae (hawk)	3	3.3	0.8
Ciconiiformes			
Ardeidae (heron)	1	1.1	0.3
Columbiformes			
Columbidae (dove)	1	1.1	0.3
Passeriformes			
Undetermined	1	1.1	0.3
Amphibia	4	100.0	1.1
Undetermined	4	100.0	1.1
Total	363		100.0

thatched roofs, dirt floors, and open doors and windows. Residents in the area have not reported seeing opossums.

In Costa Rica, where *T. dimidiata* represents the principal vector of Chagas' disease, 4.4% of this species collected inside and 17.3% collected outside of houses contained opossum blood.¹⁰ In reporting these findings, Zeledon noted that the repeated finding of opossum blood in the bugs, plus the natural association of *T. dimidiata* with this animal, is a strong indication of the important role played by both the bug and the marsupial in the maintenance and dissemination of Chagas' disease in Costa Rica. Christensen and Vasquez⁸ reported the same interrelationship be-

tween the opossum *D. marsupialis* and *R. pallescens* in central Panama.

The absence of marsupial feedings in the study area of western Panama was considered to be most likely due to low population densities of opossums rather than any disinclination on the part of the bugs to feed on these animals. *T. dimidiata* appeared to be somewhat more ornithophilic than *R. pallescens* (25% vs. 13% avian feedings, respectively). Since birds are not susceptible to *T. cruzi*, more frequent avian feeding would further reduce the likelihood of *T. dimidiata* acquiring infections.

The data indicate that the absence of marsupial feedings and the relatively high rates of avian feeding by *T. dimidiata* in the study area may, in part, account for the low infection rates in the bugs and the hypoendemicity of Chagas' disease in western Panama.

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