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Colombian Triatominae and their infestation with Trypanosomatid Flagellates

By

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With 3 tables and 1 map

Resumen

La distribución de los Triatominae de Colombia y su infestación con flagelados se presenta en forma de tablas. *Rhodnius prolixus* es el principal vector de *Trypanosoma cruzi* en Colombia y es abundante en la parte central y oriental del país. *Rhodnius prolixus, Triatoma dimidiata* y *Triatoma venosa* han sido colectados 20 veces en localidades de altura superior a los 2.000 ms, y en 10 de esas localidades los insectos estaban infectados con *Trypanosoma cruzi.* Siete de las 15 especies colombianas conocidas de Triatominae son portadoras de flagelados y *Triatoma venosa* ha sido encontrado como un nuevo huésped para *Trypanosoma cruzi.*

Summary

The distribution of colombian Triatominae and their infection with flagellates is presented in the form of tables. *Rhodnius prolixus* is the main vector of *Trypanosoma cruzi* in Colombia and is abundant in the central and eastern part of the country. *R. prolixus, Triatoma dimidiata* and *T. venosa* have been collected 20 times in localities above 2.000 m altitude and in ten of these localities the insects were infected with *Trypanosoma cruzi.* Seven of the 15 known colombian species of Triatominae harbored flagellates and *Triatoma venosa* was found to be a new intermediate host for *Trypanosoma cruzi.*

Zusammenfassung

In tabellarischer Form wird die geographische Verteilung kolumbianischer Triatominae und deren Infektion mit Flagellaten dargestellt. *Rhodnius prolixus* ist in Kolumbien der Hauptvektor von *Trypanosoma cruzi* und ist häufig im mittleren und östlichen Teil des Landes anzutreffen. *R. prolixus, Triatoma dimidiata* und *T. venosa* wurden 20mal in Höhen über 2 000 m gesammelt. An zehn dieser Fundorte waren die Insekten mit *Trypanosoma cruzi* infiziert. Sieben der bekannten 15 Arten von Triatominae beherbergen Flagellaten. *Triatoma venosa* wird als neuer Zwischenwirt von *Trypanosoma cruzi* gefunden.

Introduction

URIBE in 1929 was the first to find a colombian triatomid infected with *Trypanosoma cruzi*, and since then, numerous reports on colombian triatomids were made. However, some of the reports were incomplete, the journals obsolete, etc., and thus, it is very difficult to obtain a clear understandig of the work accomplished.

Even though many colombian physicians consider Chagas' disease to be a rare and unimportant disease, the author has estimated that about two million colombians harbour *T. cruzi* (MARINKELLE 1966).

The purpose of this paper is to review the literature pertaining to the distribution of Triatominae in Colombia, and to list the triatomids found to be infected with trypanosomatid flagellates.

Materials and Methods

Between 1962 and 1970, the author examined more than 5000 dwellings in 276 villages for the presence of triatomids. Whenever possible the bugs were examined for flagellate infestation by the methods described in previous papers (MARINKELLE 1966; MARINKELLE & DUARTE 1968).

A thorough literature search was executed and as many erroneous citations as possible were corrected by the following manner: (1) comparing the results given in various papers by the same authors; (2) revising geographical data; (3) consulting as many authors of papers as possible; and (4) visiting the localities mentioned in the older publications. Corrections in average temperature and altitudes have been made according to the latest data available.

The correction of the erroneous data was often rather difficult for the following reasons: (1) many authors gave the altitude of the nearest village in the area or the "Municipio" (a political area) from which a triatomid was brought in to them. In mountainous areas of Colombia, the altitude of the place where the bugs were actually obtained may differ considerably from the named locality; (2) the boundaries of the "departamentos" mentioned in many papers have since been changed and new ones created. The "departamentos" mentioned in this paper are those existing in 1971; (3) some localities formerly had the same name, since then many of these have new names. It was difficult at times to determine exactly where the place mentioned in some of the older publications was located.

The year indicated after author (s) in the literature reference in the tables indicates the first published record and not the year that the observation was made. The question marks in the tables signify that the

insects were not examined for the presence of flagellates, or that the authors did not give details on flagellates. All altitudes are in units of meters and the data were obtained from the "Instituto AGUSTIN CODAZZI" or taken by the author. When no data were available and localities could not be visited, the altitudes mentioned in the original paper were cited. The temperature mentioned are in degrees centigrades and obtained from the "Instituto AGUSTIN CODAZZI", or when not available taken from the original publication.

Conclusions

The results compiled from 42 years of triatomid studies by various authors in Colombia are presented in the Tables 1 to 3, and show that *Rhodnius prolixus* is the main vector of *Trypanosoma cruzi* in Colombia. *R. prolixus* is abundant in central and eastern Colombia, practically absent from the coastal regions and unknown from southern Colombia. *R. prolixus* were collected in 10 localities, *T. dimidiata* in seven localities and *T. venosa* in three localities above 2000 metres. The record of Cimitarra (Dept. Santander) refers to the first colombian sylvatic occurrence of *R. prolixus* as the specimens were collected on the bark of a palm tree.

Seven of the 15 known colombian species of triatomids harboured trypanosomatid flagellates. Triatomids infected with *T. cruzi* have been found in ten different localities at an altitude of more than 2000 m. The highest altitudes in which triatomids have been found to be infected with *T. cruzi* are respectively: 2570 m (Chiquinquirá), 2510 m (Miranda), 2230 m (Málaga) for *R. prolixus* and 2230 m (Málaga), 2200 m (San Joaquín), 2050 m (Soatá) for *T. dimidiata.* In 56 of the 84 localities where *R. prolixus* was cound by the author, the bugs were infected with *T. cruzi.* In seven of 15 localities, *Triatoma dimidiata* harboured the trypanosome and in one locality *T. venosa* was found infected with *T. cruzi. Triatoma venosa* was not reported previously to harbour *Trypanosoma cruzi.*

The *T. cruzi*-like flagellates isolated by the author from *Cavernicola pilosa* are considered to be *T. cruzi* s. l, because they produce intracellular leishmaniae in tissue culture cells, protect CFW mice against superinfection with highly pathogenic *T. cruzi* (Tulahuen) strain, are capable of infecting mice treated with Azathioprine and are capable of developing in *R. prolixus* (MARINKELLE 1968 [a] and in part unpublished results).

Even though it was not possible to correct all of the inaccuracies in the existing literature, it is hoped that the present report will be a workable basis for future investigators.

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Table 1. Distribution of Triatominae in Colombia
(No specification of Flagellates were made)

Species	"Departamentos"	Infected with flagellates	Reference
Rhodnius prolixus STAL, 1859	(For details see Table 2)		
R. pallescens BARBER, 1932	Bolívar	negative	DUARTE, 1968
	Sucre	positive	DUARTE, 1968 and personal communication
	unknown	?	RENJIFO et al., 1949
R. pictipes STAL, 1872	Caquetá	?	AUTHOR
	Meta	?	D'ALESSANDRO, personal communication
	unknown	?	DIAS, 1952
R. robustus LARROUSSE, 1927	Bolívar	?	DIAS, 1952
	N. Santander	negative	DUARTE, personal communication
	Tolima	?	D'ALESSANDRO, personal communication
R. brethesi MATTA, 1919	Meta	?	D'ALESSANDRO, personal communication
Triatoma dimidiata LATREILLE, 1811	(for details see Table 3)		
T. venosa STAL, 1872	(For details see Table 3)		
T. maculata ERICHSON, 1848	Guajira	negative	D'ALESSANDRO, personal communication
Triatoma sp.	Cundinamarca	?	REY, 1941 [b]
	Boyacá	?	BRUMPT, 1939
	N. Santander	?	BRUMPT, 1939
	Santander	?	BRUMPT, 1939
Microtriatoma manso-sotai PROSEN & MARTINEZ, 1952	Meta	?	D'ALESSANDRO, personal communication
Panstrongylus rufotuberculatus CHAMPION, 1899	Meta	?	GROOT et al., 1953 and personal communication OSORNO & RICHTER
P. geniculatus LATREILLE, 1811	Antioquia	?	DUNN, 1939 in DIAS, 1952
	Chocó	?	DUNN, 1939 in DIAS, 1952
	Huila	not examined	AUTHOR
	N. Santander	negative	GUTIERREZ, 1962
		negative	DUARTE, 1968
		positive	DUARTE, personal communication
	Santander	?	BRUMPT, 1939
	Sucre	not examined	DUARTE, 1968
	Valle	not examined	AUTHOR
Cavernicola pilosa BARBER, 1927	(For details see Table 3)		
Eratyrus cuspidatus STAL, 1859	Boyacá	?	DIAS, 1952
E. mucronatus STAL, 1859	N. Santander	positive	DUARTE, 1968
Eratyrus sp.	Valle	negative	REY & RENJIFO, 1940 in REY, 1941
Belminus rugulosus STAL, 1859	unknown	?	DIAS, 1952

(Infections with *T. rangeli* are omitted)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
Boyacá	Chiquinquirá	1	2570±	17	positive	Author
	El Morro	2	1600	21	positive	Author
	Esmeralda	3	1300	20	positive	Author
	Garagoa	4	1690	19	?	GROOT et al., 1953
	Guateque	5	1900±	20	?	REY, 1941[a]
					negative	Author
	Guayatá	6	1600	21	positive	Author
	Maní	7	900	23	positive	Author
	Miraflores	8	1430	22	?	BRUMPT, 1939
					positive	Author
	Moniquirá	9	1770	21	positive	HERNANDEZ, 1946, UCROS, personal communication
					positive	Author
	Otanche	10	1300	20	negative	Author
	Pajarito	11	900	24	negative	Author
	Pauna	12	1410	20	negative	Author
	Ramiriquí	13	2340±	19	?	DÍAS, 1952
	Soatá	14	2050±	19	?	BRUMPT, 1939
					positive	UCROS, 1940[a]
					positive	HERNANDEZ, 1947
					negative	Author
	Tinjacá	15	2010±	19	negative	Author

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.) 2

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Yopal	16	830	24	positive	Author
	"Casanare area"		no data	no data	positive	Author
Intendencia del Caquetá	Florencia	17	450	27	positive	Ucros, 1940b
					not examined	Author
Cesar	El Paso	18	50	30	negative	Author
	Manaure (not in Guajira)	19	10	30	positive	Ucros, 1967
	Media Luna	20	20	30	positive	Ucros, 1967
	Río de Oro	21	190	no records	?	d'Alessandro, 1963
Cundinamarca	Anapoima	22	800	26	?	Brumpt, 1939
	Anolaima	23	1730	22	?	Brumpt, 1939
					?	d'Alessandro, 1963
					positive	Ucros, 1967
					positive	Author
	Apulo (formerly Rafael Reyes)	24	960	23	not examined	Rey & Ucros, 1939
					positive	Ucros, 1960
					positive	Author
	Cáqueza	25	1750	20	negative	Rey, 1941b
					?	d'Alessandro, 1963
					not examined	Author
	Choachí ("Municipio")	26	1970 ±	14	not examined	Rey & Ucros, 1939
					positive	Ucros, 1960

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Fómeque	27	1930	19	positive	Rey & Ucros, 1939
					positive	Muñoz, 1945
					?	d'Alessandro, 1963
					positive	Author
	Fusagasugá	28	1750	20	positive	Caycedo & Hernandez, 1947
	Gachalá	29	1760	19	not examined	Author
	Gachetá	30	1800	20	positive	Rey, 1941[a]
					positive	Hernandez, 1940
					not examined	Author
	Girardot	31	330	29	positive	Ucros, 1940[b]
					?	d'Alessandro, 1963
					positive	Author
	Guachetá	32	2700	14	positive	Author
	Guaduas	33	1100	24	positive	Author
	Guayabal	34	1670	20	positive	Author
	La Mesa	35	1320	23	positive	Ucros, 1967
	La Palma	36	1620	20	positive	Ucros, 1967
	La Unión	37	1850	20	?	Brumpt, 1939
					positive	Rey & Ucros, 1939
					positive	Author
	La Vega	38	1180	22	positive	Rey, 1941[b]
	Las Mesitas del Colegio	39	1210	21	not examined	Ucros, 1960
	Machetá	40	2100	18	positive	Rey, 1941[b]

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Manta	41	1870	20	positive	Rey, 1941b
					not examined	Author
	Nariño	42	340	29	positive	Author
	Nilo	43	400	28	positive	Groot & Uribe, 1951
					not examined	Author
	Pacho	44	1880	18	?	Uribe, 1929
	Pandi	45	1020	24	positive	Author
	Puerto Salgar	46	190	28	positive	Author
	San Antonio de Tena	47	1510	no records	positive	Ucros, 1967
	Tibiritá	48	2010	20	positive	Rey, 1941
	Tocaima	49	530	27	positive	Author
	Ubaque	50	1720	20	?	d'Alessandro, 1963
			1870	20	positive	Ucros, 1967
			1800	20	positive	Author
	Villeta	51	840	26	positive	Author
	Viotá	52	750	20	?	Brumpt, 1939
					positive	Ucros, 1940a
			710	26	positive	Author
Guajira	Urimita	53	20	no records	positive	Ucros, 1967
Huila	Altamira	54	1070	24	positive	Author
	Baraya	55	730	26	negative	Rey, 1941b
	Campo Alegre	56	770	26	not examined	Ucros, 1941
	El Hobo	57	670	27	negative	Author

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Garzón	58	890	26	negative	Ucros, 1940[a]
	Gigante	59	860	25	positive	Ucros, 1940[a]
	Neiva	60	470	27	positive	Ucros, 1940[b]
					positive	Author
	Planadas	61	600	27	positive	Ucros, 1967
Meta	Acacías	62	500	27	positive	Ucros, 1967
			460	27	positive	Author
	Boca de Monte	63	460	29	negative	Uribe & Renjifo, 1949
	Cumaral	64	560	28	not examined	Author
	Granada	65	400	29	positive	Author
	Guamal	66	260	29	positive	Author
	Guape	67	260	29	positive	Author
	Matupa	68	400	no records	negative	Uribe & Renjifo, 1949
	Puerto López	69	250	29	negative	Author
	Quebrada Honda	70	400	28	?	Brumpt, 1939
					positive	Ucros, 1960
	Restrepo	71	550	28	negative	Groot et al., 1953
					positive	Ucros, 1967
					not examined	Author
	San Antonio	72	400	24	?	Uribe & Renjifo, 1949
	San Martín	73	400	28	?	Groot et al., 1953
					positive	Author
	"Valle del Río Ariari"	74	400	24	positive	Groot et al., 1953

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Villavicencio	75	450	27	?	Brumpt, 1939
					positive	Uribe & Renjifo, 1949
					not examined	Author
N. Santander	Catama (Corr. Tibú)	76	70	29	positive	Ucros, 1967
	Chinacota	77	1330	20	positive	Ucros, 1967
	Cornejo	78	1200	21	positive	Ucros, 1967
	Cúcuta	79	210	28	?	Brumpt, 1939
					positive	Ucros, 1940[a]
					positive	Duarte, 1968
	El Serpentino	80	60	29	positive	Author
	Gramalote	81	1020	22	positive	Author
	Petrólea	82	300	30	positive	Duarte, personal communication
					positive	Author
	Pizarreal	83	150	28	positive	Osorno et al., 1963
	Rancho Grande	84	120	28	positive	Corredor et al., 1965
	San Cayetano	85	1230	21	positive	Ucros, 1967
	Santiago	86	410	27	negative	Ucros, 1960
	Tibú	87	60	29	not examined	Ucros, 1960
					positive	Guierrez, 1962
					positive	Ucros, 1967
					positive	Duarte, personal communication
					positive	Author

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Toledo	88	1640	21	?	Brumpt, 1939
	Tres Bocas	89	50	29	not examined	Ucros, 1960
					positive	Ucros, 1967
	Villa del Rosario	90	390	26	positive	Groot et al., 1953
	Zulia	91	260	28	positive	Ucros, 1967
Santander	Barbosa	92	1300	20	positive	Author
	Bucaramanga	93	1000	24	positive	Ucros, 1960
					positive	Author
	Charalá	94	1380	21	not examined	Author
	Cimitarra	95	1200	no records	positive	Author
	Curití	96	1500	21	not examined	Author
	Guavatá	97	2160	19		Author
	Güenza	98	1500	20	positive	Author
	Güepsa	99	1540	20	positive	Author
	Málaga	100	2230	17	?	Brumpt, 1939
					positive	Ucros, 1940b
					positive	Author
	Miranda	101	2510	16	?	Brumpt, 1939
						Ucros, 1940b
	Mogotes	102	1750	21	not examined	Author
	Oiba	103	1400	20	?	Brumpt, 1939
					positive	Ucros, 1967
	Onzaga	104	2030	18	positive	Author

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Piedecuesta	105	1000	23	not examined	Ucros, 1960
	Pinchote	106	1150	22	?	d'Alessandro, 1963
	Puente Nacional	107	1620	29	?	Brumpt, 1939
					positive	Ucros, 1967
	Ríonegro	108	590	27	?	Brumpt, 1939
					positive	Ucros, 1940b
	San Gil	109	1100	24	positive	Ucros, 1960
					?	d'Alessandro, 1963
					positive	Arria, personal communication
	San Joaquín	110	2200	19	positive	Author
	San Vicente	111	290	27	not examined	Ucros, 1960
					?	d'Alessandro, 1963
					positive	Ucros, 1967
	Socorro	112	1230	33	?	Brumpt, 1939
					positive	Ucros, 1940a
	Valle	113	1410	no records	?	d'Alessandro, 1963
	Vélez	114	2170	18	?	Brumpt, 1939
					positive	Ucros, 1967
Tolima	Alvarado	115	500	28	?	Brumpt, 1939
	Buenos Aires	116	400	28	positive	Author
	Carmen de Apicalá	117	400	28	not examined	Author
	Castilla	118	310	29	positive	Author
	Coello	119	860	no records	positive	Ucros, 1967

Table 2. Distribution of *Rhodnius Prolixus* in Colombia (cont.)

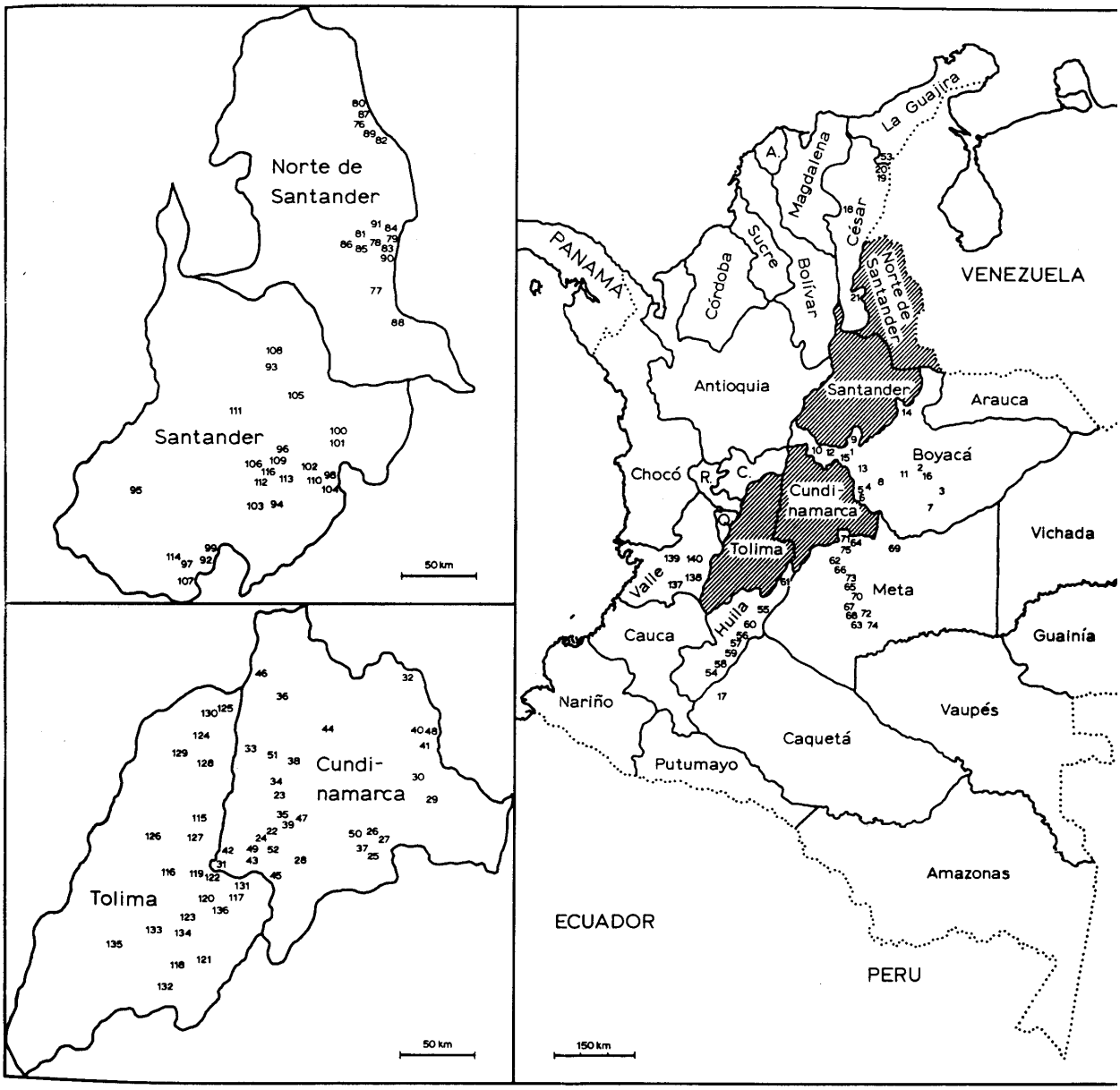
Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	El Espinal	120	440	28	positive	Ucros, 1967
	El Prado	121	330	28	positive	Uribe, 1929
	Flandes	122	330	28	positive	Author
	Guamo	123	400	28	positive	Author
	Guayabal	124	300	29	positive	Author
	Honda	125	230	29	?	Rey, 1941b
					positive	Author
	Ibagué	126	1250	22	positive	Ucros, 1940a
					negative	Author
	La Vega	127	400	28	positive	Author
	Lérida	128	440	27	negative	Author
	Líbano	129	1580	21	not examined	Author
	Mariquita	130	530	27	?	Rey, 1941b
					negative	Author
	Melgar	131	430	27	?	Groot et al., 1953
					positive	Author
	Natagaima	132	370	27	positive	Author
	Ortega	133	450	28	?	Groot et al., 1953
	Saldaña	134	400	27	positive	Author
	San Antonio	135	1490	20	negative	Author
	Suárez	136	360	28	?	d'Alessandro, 1963
Valle	Cali	137	1100	25	?	Rey, 1941a

Table 3. Distribution of uncommon triatominae from which *Trypanosoma cruzi* has been isolated in Colombia

Species	Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
Triatoma dimidiata	Boyacá	Guateque	5	1900±	20	positive	Author
		Guayatá	6	1600	21	not examined	Author
		Miraflores	8	1430	22	?	Dias, 1952
		Soatá	14	2050±	19	positive	Hernandez, 1946
						positive	Ucros, 1967
						negative	Author
	Cundinamarca	Guachetá	32	2700	14	negative	Author
		Machetá	40	2100	18	negative	Author
	Huila	Altamira	54	1070	24	positive	Author
		Garzón	58	890	26	positive	Otalora, 1952
		Neiva	60	470	27	negative	Author
	Magdalena	"Sierra Nevada"		no data	no records	?	Bonilla, 1941
		Unknown		no data	no records	?	Usinger, 1941
	N. Santander	Toledo	88	1640	18	?	Dias, 1952
	Santander	Málaga	100	2230	17	?	Dias, 1952
		Mogotes	102	1750	21	not examined	Author
		Onzaga	104	2030	18	positive	Author
		San Joaquín	110	2200	19	positive	Marinkelle, 1968 b
Triatoma venosa	Boyacá	Guateque	5	1900±	20	negative	Author
		Guayatá	6	1600	21	not examined	Author
		Tinjacá	15	2010±	19	negative	Author
		Unknown		no data	no records	?	Dias, 1952

Table. 3. Distribution of uncommon triatominae from which *Trypanosoma cruzi* has been isolated in Colombia

Species	Departamento	Locality	Number on Map	Altitude	Temperature average	Infected with *T. cruzi*	Reference
	Santander	Onzaga	104	2030	18	positive	Author
		San Joaquín	110	2200	19	negative	Author
		Unknown		no data	no records	?	DIAS, 1952
Cavernicola pilosa	Cundinamarca	Girardot	31	330	29	positive	Author
		Tocaima	49	530	27	positive	Author
		Villeta	51	840	26	positive	Author
	Meta	Granada	65	400	29	not examined	Author
	Tolima	Buenos Aires	116	400	28	positive	Author
		Guamo	123	400	28	positive	Author
		Honda	125	230	29	positive	Author
	Valle	Palmira	138	1080	25	not examined	Author
		Restrepo	139	1400	25	not examined	Author
		Santiago	140	1160	25	positive	Author


Norte de Santander
Santander
50 km
Tolima
Cundi-namarca
50 km
La Guajira
Magdalena
Cesar
PANAMA
Córdoba
Sucre
Bolívar
Norte de Santander
VENEZUELA
Antioquia
Santander
Arauca
Boyacá
Chocó
R.
C.
Cundi-namarca
Tolima
Vichada
Valle
Meta
Huila
Cauca
Guainía
Nariño
Vaupés
Caquetá
Putumayo
Amazonas
ECUADOR
PERU
150 km