

***Triatoma infestans* in Greater Buenos Aires, Argentina**

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*The Health Administration Agencies of many municipalities in Greater Buenos Aires (GBA) receive frequent reports on triatomines in houses. The aim of this work was to identify and describe the dispersal foci of *Triatoma infestans* in an urban neighborhood of GBA, and contribute to the knowledge of the epidemiological situation in the region. In June 1998, potentially infested places were entomologically evaluated. *T. infestans* was only detected in a hen building for egg production, which housed approximately 6,000 birds. A total of 2,930 insects were collected. Density was about 9 triatomines/m². The proportions of fifth instar nymphs and adults were significantly higher than those of the other stages ($p < 0.001$). The number of triatomines collected largely exceeded the highest domestic infestation found in one house from rural endemic areas of Argentina. Though triatomines were negative for *Trypanosoma cruzi*, they could acquire the parasite by coming in contact with infected people living in GBA. Besides, the numerous and widely distributed places housing hens and chickens, would favor the settlement of the vector. Together, both facts may constitute a risk of parasitic vectorial transmission.*

It is recommended to intensify systematic activities of vector search and case detection in GBA.

Key words: *Triatoma infestans* - hens - urban triatomine foci - Greater Buenos Aires - Argentina

Chagas disease is the most important endemic antrozo-zoonosis in Argentina, regarding that over 2 million people are infected by *Trypanosoma cruzi* (Segura et al. 1985). *Triatoma infestans*, the main vector, is found in rural, urban and periurban areas (Ronderos & Schnack 1987). Historically, the areas of highest vectorial transmission were located in north and center of the country (Curto de Casas 1985, Ronderos & Schnack 1987). Through the South Cone Initiative for the elimination of *T. infestans*, the interruption of *T. cruzi* transmission in the whole country was expected by the year 2000 (Schmunis et al. 1996). Accordingly, the National Chagas disease Control Agency carried out an insecticidal treatment in the dwellings of 19 provinces considered having an intense vectorial transmission (OPS 1997). This campaign did not include the Province of Buenos Aires as it has been occurring from the 60's, at the beginning of the Vector Control Program (Ministerio de Bienestar Social 1977).

However, previous studies had shown the existence of vectorial transmission in the Province of Buenos Aires. Carcavallo et al. (1969) found 30% of houses infested by *T. infestans* and one acute case of Chagas disease in a neighborhood of Bahía Blanca City. Carcavallo and Plencovich (1973) reported that between 1965 and 1970, 3,407 *T. infestans* with a *T. cruzi* infection of 13.7%, were collected throughout the province. In 19 municipalities located in the center and west of the province, Etcheverry (1976) collected 4,935 triatomines showing an infection rate that ranged from 8 to 19%, and reported 15 autochthonous cases. Greater Buenos Aires (GBA), the urban belt surrounding the Federal District, has also been mentioned as infested by *T. infestans*. Carcavallo and Plencovich (1973) informed that 422 *T. infestans* – 8.7% infected by *T. cruzi* – were mainly found in north-eastern municipalities.

The GBA, formed by 19 municipalities, together with the Federal District (Buenos Aires City) constitute the Metropolitan area (Fig. 1). It is an urban agglomeration with undefined limits where in an area of 3,680 km² live 2,160 inhabitants per km² (INDEC 1991). The GBA is an important point of social confluence, attracting a continuous flood of migrants from inside and nearby countries, many of which are highly endemic (De Marco et al. 1994).

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Currently, the Health Administration Agencies of many GBA municipalities (e.g. San Martín, La Matanza, General Rodríguez, Luján, Florencio Varela, Fig. 1) receive frequent reports concerning the presence of triatomines (Patricia Gajate, manus. in prep.). That is the case of La Esmeralda, a neighborhood in the municipality of Florencio Varela (MFV), where many inhabitants have been finding triatomines in their houses since 1983.

The aim of this work was to identify and describe the dispersal foci of *T. infestans* in La Esmeralda neighborhood as well as to contribute to the knowledge of the epidemiological situation in GBA.

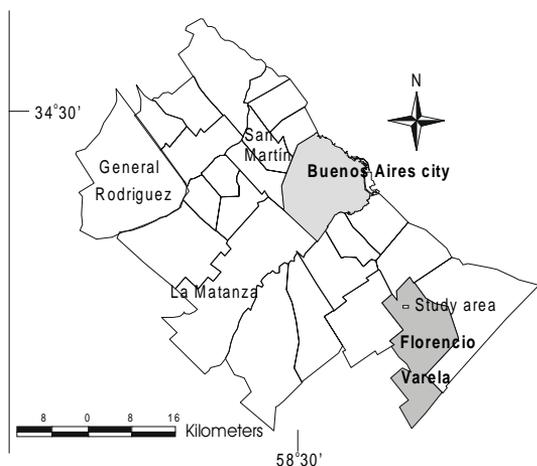


Fig. 1: metropolitan area: Greater Buenos Aires and Federal District, Buenos Aires province, Argentina

MATERIALS AND METHODS

The climate of GBA is temperate humid, the mean annual RH is 76% and the mean annual temperature is 15.8°C (Estadísticas Climatológicas 1992). During June-July 1998, when the present survey was performed, the minimum, maximum and mean temperatures recorded were 2.4°C, 22.6°C and 13°C, respectively.

The municipality of Florencio Varela, located in the southeast of GBA (34°50'S, 58°40'E, Fig. 1), has a population of 253,554 inhabitants residing in 65,300 buildings. It shows a low standard of living reflected in poor housing conditions, overcrowded dwellings and a deficient sanitary infrastructure (Ministerio del Interior 1995).

In June 1998, the urban neighborhood La Esmeralda (Fig. 2) was inspected to recognize and carry out an entomological evaluation of the potential *T. infestans* dispersal foci. Sampling places were selected according to their proximity to the domiciles from where triatomines had been reported and the type of productive activities they

developed. Thus, places sampled were as follows (Fig. 2): (i) *hen building for egg production*: it was a shed roofed with fiberglass, occupying a total area of 600 m². The lower half of the walls was made of bricks covered with cracked concrete, and the upper half was wire mesh. The building harbored approximately 6,000 laying hens. Birds brooded in shelters consisting of six wooden cubes of 1.35 cm³ each, opened at the front and arranged in three rows and two files. Cubes contained wood shaving beds for nesting. When not brooding, hens walked around or roosted near the walls. The proprietor had been running the place for 50 years; he and his family lived in a house five meters away the building; (ii) *family chicken house*: in a backyard of 6 m², ten birds were bred in roofed cages made of wood and wire net; (iii) *carpentry*: it stored numerous logs that came from Entre Ríos in north-eastern Argentina, an endemic province for Chagas disease; (iv) *commercial rabbit breeding house*: 50 rabbits were bred in 30 cages. Twenty metallic cages were inside a shed of 10 m²; the remainder, made of concrete and wire net, were placed outdoors.

A two-person team examined carefully the walls, roofs, animals, goods and furniture present in all areas to detect any sign of triatomine infestation (fecal streaks, exuviae and/or the insect itself). When the place was infested, it was totally sprayed with deltamethrin (0.2%, K-Othrina®, Agrevo, Hoechst and Schering) after the temporary removal

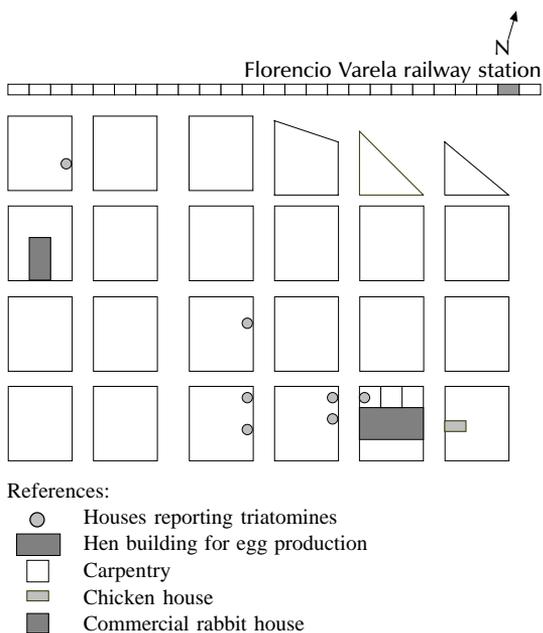


Fig. 2: La Esmeralda neighborhood, Florencio Varela, June-July 1998

of the domestic animals. All insects that appeared before and after the insecticidal treatment were collected in properly labeled bags and shipped immediately to the laboratory. Triatomines were identified taxonomically (Lent & Wygodzinsky 1979) and classified according to their developmental stage and sex. *T. cruzi* infection was determined by the optical microscopic examination of insect feces at 400 x (Wisnivesky-Colli et al. 1982).

The χ^2 test was used to compare the proportions of collected nymphs and adults (Fleiss 1981).

RESULTS

Infestation was only detected in the commercial laying hen building. From a total of 2,930 *T. infestans*, 1,233 (42%) were caught mainly from shelters. Insects were hidden in the space left between the back of the shelter and the wall, in the angles of the cubes and inside crevices of the wood. The approximate mean density was 9 triatomines per m².

The Table shows the *T. infestans* frequencies of the captured individuals according to developmental stage, sex and place of capture. Due to the magnitude of the place, and the bird and insect abundance, the entomological evaluation and the insecticidal treatment were achieved in four occasions. All stages were present in the colony, and 35% of the collected insects were adults. The proportions of fifth instar nymphs and adults were significantly higher than those of the other stages (p < 0.001), and represented 73% of the whole collection. The female/male ratio was 1:1. Triatomines were not infected by *T. cruzi*.

When the owner was notified of the extent of infestation, he recognized that he had already seen them in many opportunities. Repeated attempts to evaluate his house failed due to his persistent refusal, in spite of our warning about the health risk involved. In order to examine the area near the focus, it was required a meeting between neighbors

and us, that should be arranged by the Neighborhood Society. Unfortunately, its committee is still avoiding the meeting by reasons external to this study.

Three months later, only 12 *T. infestans* were found after a second entomological evaluation, and the building was sprayed again with deltamethrin.

In December 1998, the chicken house was shut down and birds were removed, but our recommendation of burning nests and other goods was disregarded. Since then, no further reports on triatomine presence were received from the neighborhood.

DISCUSSION

In this work, we notify the presence of almost 3,000 vectors of Chagas disease in an urban area of a densely populated municipality. The large number of *T. infestans* individuals found during the winter in La Esmeralda neighborhood, remarkably exceeded the highest domestic infestation recorded in one house during the warm seasons of any studied rural endemic area. For example, in the Province of Santiago del Estero, Argentina, the maximum number of *T. infestans* found in the walls and beds of a rural house was 305 individuals (Rabinovich et al. 1990). In addition, this house showed half the population density found in the hen building (4.5 and 9 triatomines/m², respectively). Therefore, our results suggest that the chicken house provided suitable requirements of shelter and blood meal for the development of a high density *T. infestans* population, in spite of the low winter temperatures. This fact together with the reports from nearby houses on the presence of *T. infestans* during the last 15 years would indicate that it was a long standing focus and an important dispersal source.

Though triatomines were not infected by *T. cruzi*, presumably because they had fed on bird, they could acquire the parasite by coming in contact with infected people. Rosenstein-Campanini

TABLE

Nymphs and adults of *Triatoma infestans* collected in a commercial laying hen building. June and July 1998, La Esmeralda, municipality of Florencio Varela, Greater Buenos Aires, Argentina

Sampling date	<i>Triatoma infestans</i>							
	Adults			Nymphs				
	Males	Females	Total (adults)	N5	N4	N3-2-1	Total (nymphs)	Total
Jun-29	73	90	163	96	3	45	144	307
Jul-6	222	214	436	527	180	189	896	1,332
Jul-13	91	52	143	336	119	175	630	773
Jul-20	99	177	276	160	50	32	242	518
Total	485	533	1,018	1,119	352	441	1,912	2,930
(%)			(35)	(38)	(12)	(15)		(100)

et al. (1992), reported that the infection prevalence of GBA inhabitants was 5%, the percentage was calculated considering approximately 400,000 infected people from 8,000,000 GBA inhabitants recorded in the last population census (INDEC 1991), as high as the one recorded in provinces where vectorial transmission usually takes place. Even if most of the seropositive people living in GBA were in the chronic phase of the disease, the number of their blood trypomastigotes should be enough to infect a considerable proportion of triatomines. In a research performed by Schenone et al. (1972) with 764 chronic patients, 49.3% of all the xenodiagnosis boxes turned positive. Because every patient received one box containing between 7 to 10 *T. infestans* nymphs and the insects from each box were examined together, we arrive at the conclusion that 49.3% of the patients could infect at least one triatomine. Moreover, Cerisola et al. (1974) found that 30 chronic patients were able to infect a minimum of 1,424 triatomines, at the end of a 3-year longitudinal study.

On the other hand, the close association between *T. infestans* and domestic birds has been fully demonstrated (Gajate et al. 1994, Vallvé et al. 1995). Therefore, the presence of numerous and widely distributed places where chickens and hens are gathered may constitute an advantageous condition for the settlement of the vector in GBA.

The results reported here, together with the detection of other scattered foci in different municipalities, indicate the need of intensive and systematic activities of vector search and case detection to demonstrate the actual vectorial transmission occurrence in GBA.

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