

## THE PALM TREE *COPERNICIA CERIFERA* (CARNAÚBA) AS AN ECOTOPE OF *RHODNIUS NASUTUS* IN RURAL AREAS OF THE STATE OF PIAUÍ NORTHEASTERN BRAZIL

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The *C. cerifera* palm tree (carnaúba) is widely distributed in the Northeastern Brazil, including the state of Piauí. This investigation revealed that *R. nasutus* is the only triatomine species captured on that palm tree, in five different localities. 78% of palm trees were infested with triatomines, and 4.0% were infected with flagellates morphologically and biologically indistinguishable from *Trypanosoma cruzi*. Birds, rodents and marsupials were found as major blood meal sources for *R. nasutus*.

Key words: Triatomine. *Rhodnius nasutus*. Ecotope. *Copernicia cerifera*.

Palm trees of several species are described in South and Central America as ecotopes of triatomine vectors of *T. cruzi*, the aetiological agent of Chagas' disease<sup>1 2 3 4 5 6 10</sup>.

The paper describes the palm tree *C. cerifera* as the ecotope of *R. nasutus* in five different localities of the rural area of the State of Piauí.

### MATERIALS AND METHODS

**Capture of insects.** In order to capture triatomines, palm trees were cut down over a white cloth. Each frond was removed from its base and carefully searched for the presence of triatomines. Any mammals were captured. The distribution of the five localities in the State of Piauí where palm trees were searched is shown in Figure 1.

**Examination of triatomines.** The triatomines were classified and examined for the presence of flagellates by abdominal compression or gut dissection. Groups of 3 mice (approximately 2 months old) were inoculated intraperitoneally with flagellates collected from the triatomines. Mice were later examined by fresh blood preparations and xenodiagnosis in order to detect parasitaemia. The captured mammals were also examined for the presence of flagellates by the above two methods.

**Blood meal source of triatomines.** Evaluation of blood meal source by means of a precipitin test, using the gut content of triatomines, was performed at the Gorgas Laboratory (WHO-Panamá).

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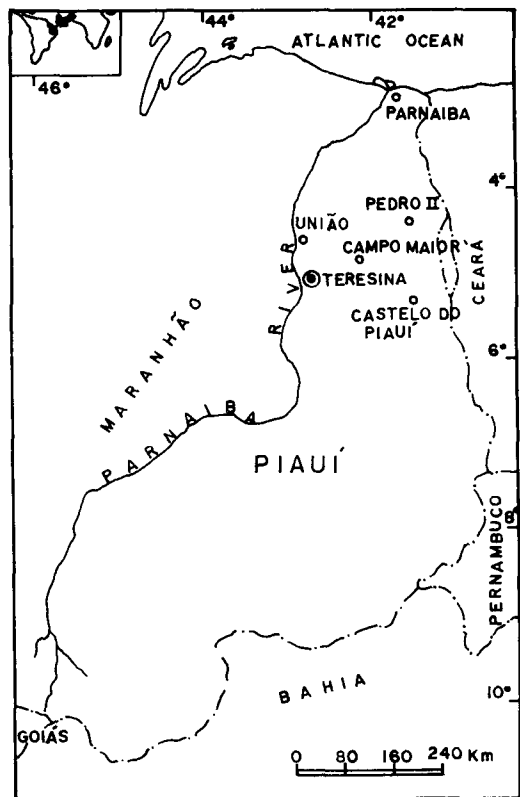


Figure 1 - Map of the State of Piauí, showing the localities in the rural zone, where the palm trees *C. cerifera* (carnaúba) were searched for the presence of triatomines. The State's capital (Teresina) is also indicated.

**Xenodiagnosis.** This technique, as used by Freitas<sup>9</sup>, consisted of feeding clean triatomines (3-4 instar), reared in the laboratory on vertebrate blood. It was performed using the species *Triatoma brasiliensis*, *Rhodnius prolixus* and *Dipetalogaster maximus*. About 10 insects were fed on each animal and

their faeces submitted to microscopical examination 25 to 30 days after feeding.

### RESULTS

Among 50 palm trees searched, 39 were infested by triatomines (78.0%). A total of 234 triatomines were captured all being *R. nasutus*. The infection rate with *T. cruzi* was low (mean 4%). Table

1 shows the data on the triatomines captured, and their infection index.

All groups of young mice inoculated with flagellates isolated from captured triatomines showed detectable parasitaemia. Of 78 precipitin tests performed, 76 were positive against different antisera, as showed in Table 2. *R. nasutus* fed mainly on birds, rodents and marsupials.

Table 1 – Data on the *Rhodnius nasutus* captured on palm tree *Copernicia cerifera* (carnaúba) in five different localities, State of Piauí, Northeastern Brazil, and examined for *T. cruzi*.

Locality	Adults			Larvae			Totals			%
	Captured	Examined	Infected	Captured	Examined	Infected	Captured	Examined	Infected	
União	2	2	0	15	15	0	17	17	0	0.0
Campo Maior	10	10	2	28	28	0	38	38	2	5.0
Castelo do Piauí	20	20	0	20	20	0	40	40	0	0.0
Pedro II	5	5	1	52	52	0	57	57	1	2.0
Parnaíba	6	5	3	76	75	4	82	80	7	9.0
Total	43	42	6	201	190	4	234	232	10	4.0

Table 2 – Precipitin test for the identification of the blood meal source *R. nasutus* captured on palm trees *Copernicia cerifera* (carnaúba) in five different localities, State of Piauí, Northeastern Brazil.

Locality	Reactivity to precipitin test							Total reactive
	Anti-Bird	Anti-rodent (Cricetidae)	Anti-marsupial (Didelphidae)	Anti-amphibian	Anti-reptile	Anti-mammalian	Anti-bird and reptile	
União	3	–	–	–	–	–	–	3
Campo Maior	2	5	–	4	4	2	1	18
Castelo do Piauí	13	6	8	–	–	–	–	27
Pedro II	2	9	2	–	1	2	1	17
Parnaíba	3	1	–	1	–	–	1	6
Total	23	21	10	5	5	4	3	71

An adult female of *Marmosa agilis agilis* and two *Weidomys pyrhorrinus* were captured on palm trees. None of them were found infected by flagellates.

### DISCUSSION

The triatomine species *R. nasutus* found on the palm tree *C. cerifera* in the present survey were also predominant on the palm tree *Orbignya martiana* (babaçu) found in the urban zone of Teresina<sup>5</sup>. These palm species are widely distributed in this State. *R. nasutus* is reported as capable of colonizing natural

and artificial ecotopes, and seems to be restricted to the Northeastern Brazil<sup>7 8 11</sup>.

The high index of palm tree infestation, the predominance of young instars, and the data on the blood meal source of *R. nasutus* presented here, agrees with our previous findings<sup>5</sup>. Contrary to the previous report, lower numbers of triatomine per palm and a lower infection index of the triatomine by flagellates, were found. *C. cerifera* is preserved in the rural area of the State of Piauí (from its leaves carnauba wax is extracted) and this may have led to the maintenance of a relative ecological equilibrium.

We believe that the flagellates found in the *R. nasutus* in the present study are *T. cruzi*, mainly by their capacity to produce parasitaemia in young mice, and because flagellates with similar characteristics were found in this triatomine species in the urban zone of Teresina<sup>5</sup>.

Chagas' disease remains a serious public health problem in Brazil. In many regions the *T. cruzi* sylvatic cycle may have importance in maintaining the domestic cycle. Thus, the characteristics of the sylvatic cycle in each region may be important in future campaigns to control the disease.

### SUMÁRIO

*A palmeira C. cerifera* (carnaúba) é largamente distribuída no Nordeste do Brasil onde está situado o Estado do Piauí. Esta investigação revelou que *R. nasutus* foi a única espécie de triatomíneo capturada neste tipo de palmeira, na área rural deste Estado, em cinco localidades diferentes. Setenta e oito por cento das palmeiras estavam infestadas com triatomíneos, dos quais 4,0% estavam infectados com flagelados morfológicamente e biologicamente indistinguíveis do *T. cruzi*. Aves, roedores e marsupiais foram identificados como as principais fontes alimentares para o *R. nasutus*.

Palavras chaves: Triatomíneo. *Rhodnius nasutus*. Ecótopo. *Copernicia cerifera*.

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