

## Short Report

Which species of *Rhodnius* is invading houses in Brazil?

J. P. Dujardin<sup>1,2\*</sup>, M. T. Garcia-Zapata<sup>3</sup>, J. Jurberg<sup>4</sup>, P. Roelants<sup>1</sup>, L. Cardozo<sup>5</sup>, F. Panzera<sup>6</sup>, J. C. P. Dias<sup>7</sup> and C. J. Schofield<sup>8</sup> <sup>1</sup>Institut de Médecine Tropicale Prince Léopold, Nationalestraat 155, B-2000, Antwerpen, Belgium; <sup>2</sup>ORSTOM, Centre de Montpellier, 2051 Avenue du Val de Montferand, BP 5045, F-34032 Montpellier cedex 1, France; <sup>3</sup>Núcleo de Medicina Tropical, Universidade de Brasília, CP 15-2924-UNB, Brasília, DF, 70-919, Brazil; <sup>4</sup>FIOCRUZ, Laboratorio Nacional e Internacional de Referencia em Taxonomia de Triatomíneos, Departamento de Entomologia, Av. Brasil 4365, CP 926, Rio de Janeiro, RJ, 20041 Brazil; <sup>5</sup>Centro Nacional de Enfermedades Tropicales, Casilla 2974, Santa Cruz, Bolivia; <sup>6</sup>Departamento de Genética, Universidad de la República, Calle Tristan Naraja 1674, 11200 Montevideo, Uruguay; <sup>7</sup>Centro de Pesquisas Rene Rachou, CP 1743, 30000 Belo Horizonte, MG, Brazil; <sup>8</sup>Division of Medical Entomology, Natural History Museum, London, SW7 5BD, UK

Recent observations have drawn attention to the behaviour of some sylvatic species of *Rhodnius* which appear to be invading houses with increasing frequency. This apparent trend to domesticity is observed, for example, in *R. neglectus*, (see CARVALHEIRO & BARRETO, 1976; SILVEIRA *et al.*, 1983), *R. pictipes* (see TIBAYRENC & LE PONT, 1984), and *R. nasutus* (see ALENCAR, 1987; SILVEIRA *et al.*, 1984), and may represent a transitional phase to increasing vectorial importance (SCHOFIELD, 1988). Of the 11 described species of *Rhodnius*, 3 are commonly found in domestic situations (*R. prolixus* in Venezuela, Colombia and some parts of Central America, *R. pallidus* in Panama, *R. ecuadoriensis* in Ecuador and northern Peru), where they may be important vectors of *Trypanosoma cruzi*, causative agent of Chagas disease. The other species are more usually recorded from arboreal habitats such as palm tree crowns and bromeliads, and have been assumed to have little vectorial importance. However, it has been claimed that *R. prolixus* may also be found in central Brazil (DIOTAIUTI *et al.*, 1984; SILVEIRA *et al.*, 1982), outside its currently accepted range. Such reports could be due to misidentification of morphologically similar species such as *R. neglectus*, a sylvatic species commonly found in palm tree crowns in central Brazil (LENT, 1954; CARVALHEIRO & BARRETO, 1976; DIOTAIUTI & DIAS, 1984), but increasingly reported in houses and peridomestic situations—especially in areas where the main domestic vector, *Triatoma infestans*, has been controlled (DIAS, 1988; GARCIA-ZAPATA *et al.*, 1985). Both species have very similar external morphology, being distinguished mainly by details of the male genitalia (LENT & JURBERG, 1969; LENT & WYGODZINSKY, 1979) (see note 1). However,

using isoenzyme electrophoretic analysis at 15 loci (DUJARDIN *et al.*, 1988), combined with crossing experiments, we were unable to distinguish different laboratory strains of *R. prolixus* (IMT and CENETROP) (see note 2) from each other and from 2 successive batches of *R. neglectus* collected from peridomestic habitats in the state of Goiás, Brazil (see note 3). Laboratory crosses between these strains of *Rhodnius* gave normally fertile eggs, and chromosome C-banding studies revealed no difference between the IMT *R. prolixus* and the wild-caught *R. neglectus* (PANZERA *et al.*, 1988; VAIO *et al.*, 1985). Moreover, using 7 of the electrophoretic enzyme loci as a preliminary biochemical key (DUJARDIN, 1988), the laboratory reference strain of *R. prolixus* maintained at the FIOCRUZ insectary was also indistinguishable from the other *R. prolixus* strains and from the wild-caught *R. neglectus* (and gave normally fertile eggs when crossed with the latter), whereas the FIOCRUZ reference strain of *R. neglectus* was found to differ completely at 5 loci. The genetic difference between the FIOCRUZ *R. neglectus* and all the other strains being studied could not be attributed to simple genetic drift likely to occur in laboratory strains, because complete sterility (aborted eggs) was observed in crosses between them. Reproductive isolation is evidence that they are different species, suggesting that a species other than the reference strain of *R. neglectus* is entering houses in central Brazil. On the other hand, fertility in the laboratory crosses between *R. prolixus* and wild-caught *R. neglectus*, combined with their electrophoretic identity, is not proof that they belong to the same species but lends support to the idea that *R. prolixus* may be more widespread than previously thought (see note 1), and may be the species invading houses in central Brazil.

## Acknowledgements

This work was supported by the Belgian Fonds BRODEN, FNRS 1.5.184.90.F funds, and CI 1-0470-B grant. We thank M. Tibayrenc for reviewing this manuscript, and P. D. Marsden who kindly supported our investigation.

## Notes

1. *R. prolixus* was originally described by STAL (1859) from Venezuelan material, and further material from a variety of localities was thoroughly redescribed by LENT (1948). Until 1954, this was considered the principle species of *Rhodnius*, reported over a wide geographical area from southern and central Brazil, Bolivia, the Guianas, Venezuela, Colombia and parts of Central America. However, with the description of *R. neglectus* by LENT (1954), based mainly on material from Minas Gerais but including several other Brazilian specimens previously determined as *R. prolixus*, the status of earlier distribution records for *R. prolixus* came into question. Distribution records for *R. neglectus* given by LENT & JURBERG (1969) and LENT & WYGODZINSKY (1979) suggested that this species is restricted to the savanna-like areas of the Brazilian states of Bahia, Goiás, Mato Grosso, Minas Gerais and São Paulo, with *R. prolixus* associated with the more humid areas of the Amazon basin northwards into Central America. Another morphologically similar species, *R. nasutus*, is considered restricted to the drier *caatinga* of north-western Brazil (LENT & JURBERG, 1969), although its behaviour and ecological associations appear otherwise similar to those of *R. neglectus* (ALENCAR, 1987).

2. The IMT strain of *R. prolixus* is believed to have originated, via the London School of Hygiene and Tropical

\* Author for correspondence (Montpellier address).

Medicine, from specimens originally collected from Venezuela between 1913–1924, which were probably mixed with further specimens also collected in Venezuela in 1956. The CENETROP strains of *R. prolixus* appear to have been brought from Venezuela during the 1970s.

3. The *R. neglectus* were freshly collected from peridomestic habitats in the municipality of Mambai, Goiás, an area where this species is commonly reported from palm tree crowns. The area is biogeographically similar to the type locality of this species in the neighbouring state of Minas Gerais.

## References

- Alencar, J. E. de (1987). *História Natural da Doença de Chagas no Estado de Ceará*. Fortaleza, Brazil: Imprensa Universitária da UFC.
- Carvalho, J. R. & Barreto, M. P. (1976). Estudos sobre reservatórios e vectores silvestres do *Trypanosoma cruzi*. LX—Tentativas de cruzamento de *Rhodnius prolixus* Stal, 1859, com *Rhodnius neglectus* Lent, 1954 (Hemiptera, Reduviidae). *Revista do Instituto de Medicina Tropical de São Paulo*, 18, 17–23.
- Dias, J. C. P. (1988). Controle de vectores da doença de Chagas no Brasil e riscos de reinvasão domiciliar por vectores secundários. *Memórias do Instituto Oswaldo Cruz*, 83, supplement 1, 387–391.
- Diotaiuti, L. & Dias, J. C. P. (1984). Ocorrência e biologia do *Rhodnius neglectus* Lent 1954 em Macaubeiras da periferia de Belo Horizonte, Minas Gerais. *Memórias do Instituto Oswaldo Cruz*, 79, 3.
- Diotaiuti, L., Silveira, A. C. & Elias, M. (1984). Sobre o encontro de *Rhodnius prolixus* Stal, 1859, em Macaubeiras. *Revista Brasileira de Malariologia e Doenças Tropicais* 36, 11–14.
- Dujardin, J. P. (1988). Potential of genetic methods for systematics of Triatominae. V. *Reunião sobre Pesquisa aplicada em Doença de Chagas, Araxá*, pp. 26–30.
- Dujardin, J. P., Le Pont, F., Garcia-Zapata, M. T., Cardozo, L., Bermudez, H., Tibayrenc, M. & Schofield, C. J. (1988). *Rhodnius prolixus*, *R. neglectus*, *R. pictipes* and *Triatoma infestans*: an electrophoretic comparison. V. *Reunião sobre Pesquisa aplicada em Doença de Chagas, Araxá*, p. 83.
- Garcia-Zapata, M. T., Virgens, D., Soares, V. A., Bosworth, A. & Marsden, P. D. (1985). House invasion by secondary triatomine species in Mambai, Goiás-Brazil. *Revista da Sociedade Brasileira de Medicina Tropical*, 18, 199–201.
- Lent, H. (1948). O gênero *Rhodnius* Stal, 1859 (Hemiptera, Reduviidae). *Revista Brasileira de Biologia*, 8, 297–339.
- Lent, H. (1954). Comentários sobre o gênero *Rhodnius* Stal, com descrição de uma nova espécie do Brasil (Hemiptera, Reduviidae). *Revista Brasileira de Biologia*, 14, 237–247.
- Lent, H. & Jurberg, J. O. (1969). O gênero “*Rhodnius*” Stal, 1859, com um estudo sobre a genitalia das espécies (Hemiptera, Reduviidae). *Revista Brasileira de Biologia*, 29, 487–560.
- Lent, H. & Wygodzinsky, P. (1979). Revision of the Triatominae (Hemiptera, Reduviidae), and their significance as vectors of Chagas disease. *Bulletin of the National Museum of Natural History*, 163, (3), 1–520.
- Panzer, F., Scvortzoff, E., Cossio, G. & Salvatella, R. (1988). Description of male meiosis in two triatomine species (Hemiptera—Reduviidae). *Proceedings of Conference on Recent Advances in Cytogenetic Research, Kurukshetra, India*, p. 62.
- Schofield, C. (1988). Biosystematics of Triatominae. In: *Biosystematics of Haematophagous Insects*, Service, M. W. (editor). Oxford: Clarendon Press, Systematics Association Special Volume no. 37, pp. 287–312.
- Silveira, A. C., Mattos, C. A., Elias, M. & Luz, F. C. (1982). *Rhodnius prolixus* Stal, 1859, em Goiás, Brasil. Nota previa. *Revista Brasileira de Malariologia e Doenças Tropicais*, 34, 116–118.
- Silveira, A. C., Diotaiuti, L., Neiva, E., Matos, C. A. S. & Elias, M. N. (1983). Domiciliação de *Rhodnius neglectus* Lent, 1954, no Estado de Goiás, Brasil. In: *X Reunião Anual de Pesquisa Básica em Doença de Chagas, Caxambu, Programa e Resumos de Comunicações*, 1, pp. 5–8.
- Silveira, A. C., Feitosa, V. R. & Borges, R. (1984). Distribuição de triatomeos capturados no ambiente domiciliar, no período 1975/83, Brazil. *Revista Brasileira de Malariologia e Doenças Tropicais*, 36, 15–312.
- Stal, C. (1859). Monographie der Gattung *Conorhinus* und Verwandten. *Berliner Entomologische Zeitschrift*, 3, 99–117.
- Tibayrenc, M. & Le Pont, F. (1984). Etudes isoenzymatiques d'isolats boliviens de *Trypanosoma cruzi* pratiqués chez *Rhodnius pictipes*. Données préliminaires sur la transmission de la maladie de Chagas dans l'Alt Beni bolivien. *Cahiers ORSTOM, Série Entomologie Médicale et Parasitologie*, 22, 55–57.
- Vaio, E. S. de, Grucci, B., Castagnino, A. M., Franca, M. E. & Martínez, M. E. (1985). Meiotic differences between three triatomine species (Hemiptera, Reduviidae). *Genetica*, 67, 185–191.

Received 29 January 1991; revised 1 May 1991; accepted for publication 1 May 1991