

Zeitschrift:	Acta Tropica
Herausgeber:	Schweizerisches Tropeninstitut (Basel)
Band:	36 (1979)
Heft:	1
Artikel:	Demonstration of isobutyric acid in some triatomine bugs : short communication
Autor:	Schofield, C.J.
DOI:	https://doi.org/10.5169/seals-312512

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 12.01.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Department of Entomology, London School of Hygiene and Tropical Medicine

Demonstration of isobutyric acid in some triatomine bugs

Short communication

C. J. SCHOFIELD

Like most of the Reduviidae, adult stages of Triatominae possess two pairs of metathoracic scent glands. The ventrally situated metasternal glands open just anterior to the metacoxal cavities, and the dorsally situated Brindleys glands open just within the upper posterior angle of the metathoracic epimeron (Brindley, 1930; Carayon, 1971). The morphology and ultrastructure of both pairs of glands in adult *Panstrongylus megistus* (Burmeister) have been described by Schofield and Upton (1978). Immature stages of Triatominae possess neither metasternal nor Brindleys glands.

The secretions of the metasternal glands of adult Triatominae have not yet been identified. However, the Brindleys glands of *Rhodnius prolixus* (Stahl), *P. megistus*, and *Triatoma phyllosoma* (Burmeister) have been shown to secrete isobutyric acid, without other detectable components (Games et al., 1974; Patten and Staddon, 1972; Kälin and Barrett, 1975).

Isobutyric acid is both corrosive and pungent, and its ejection from the Brindleys glands can be observed under the dissection microscope when an immobilized adult triatomine bug (e.g. *P. megistus*) is vigorously prodded. A possible interpretation of these observations is that isobutyric acid is secreted for purposes of defense. It was of interest therefore, to see if this acid was secreted by species other than the three mentioned above.

The insects used were taken from colonies maintained for several years at the London School of Hygiene and Tropical Medicine in insectaries at 27° C and 40–80% RH. 20–25 adults (mixed males and females) of each of six species of Triatominae (*P. megistus* Burmeister; *R. prolixus* Stahl; *T. infestans* Klug; *T. maculata* Erichson; *T. brasiliensis* Neiva; and *T. vitticeps* Stahl), starved for 2 weeks, were placed in a clean glass vessel containing a magnetic stirrer. As the bugs were agitated by the slowly-revolving stirrer, a continuous, charcoal-filtered, water-saturated, airstream was passed over the bugs and then over a glass

Correspondence: Dr. C. J. Schofield, Departamento de Entomologia, Pavilhão Carlos Chagas, Instituto Oswaldo Cruz, C.P. 926, 20000 Rio de Janeiro, Brazil

'finger' which was cooled by being filled with liquid nitrogen. The airstream was very slow, about 4 ml per min, and was passed by a suction pump placed after the glass finger to avoid contamination by the pump itself.

After 4–5 h, the ice which formed on the outside of the glass finger was washed off with about 10 ml of redistilled acetone, which was then dried by standing over anhydrous sodium sulphite powder for 24 h. The dried acetone was filtered under pressure through sintered glass and concentrated by rotary evaporation at 25° C to about 0.5 ml. 1 μ l samples of this were injected into a Perkin-Elmer F11 GLC onto a column of 2.5% silicone gum-rubber on Chromosorb-G at 180° C.

At least one sample of secretion from each species of bug revealed a small peak on analysis, with a retention time similar to authentic samples of isobutyric acid. These samples were then checked by simultaneous injection of sample plus an equivalent amount of 0.01% synthetic isobutyric acid in acetone, whereupon only one peak (of increased size) was apparent. No peaks other than that of isobutyric acid were seen.

In one experiment, a sample was derived from a group of *P. megistus* which had their Brindleys gland ostioles blocked with nail-varnish. This sample did not reveal a peak on analysis.

In the original analyses by Pattenden and Staddon (1972) and Games et al. (1974), the Brindleys glands were dissected out of individual bugs, dried, punctured, and the contents taken by micropipette for analysis by both temperature-programmed gas-chromatography and by mass-spectrophotometry. The simple analyses reported here are not conclusive, but are in agreement with the work of these authors, and with Kälin and Barrett (1975) who showed that air above 20 'scent-releasing' adult *R. prolixus* contained isobutyric acid. Thus, it is justified to assume that there are at least 7 species of Triatominae, representing 3 genera, which secrete isobutyric acid when disturbed. It is worth noting in addition that 10 other species of Triatominae, including *Dipetalogaster maximus* (in spite of a report to the contrary by Mazzotti, 1970), and some predatory reduviids of the genera *Reduvius*, *Zelus*, and *Zelurus* have released an odour when handled by the author, which seems similar to that of isobutyric acid. It is possible that isobutyric acid may be a characteristic secretion, not only of Triatominae as suggested by Games et al. (1974), but also of other Reduviidae which possess Brindleys glands.

Acknowledgments. I thank Professor D. S. Bertram for providing facilities for this work which was supported by grants from the MRC and ODA, London.

- 1 Brindley M. D. H.: On the metasternal glands of certain Heteroptera. *Trans. roy. ent. Soc. Lond.* 2, 199–208 (1930).
- 2 Carayon J.: Notes et documents sur l'appareil odorant métathoracique des hémiptères. *Ann. Soc. Entomol. franç.* 7, 737–770 (1971).

- 3 Games D. E., Schofield C. J., Staddon B. W.: The secretion from Brindleys scent glands in Triatominae. *Ann. ent. Soc. Amer.* 67, 820 (1974).
- 4 Kälin M., Barrett F. M.: Observations on the anatomy, histology, release site, and function of Brindleys glands in the blood-sucking bug *Rhodnius prolixus* (Heteroptera: Reduviidae). *Ann. ent. Soc. Amer.* 68, 126–134 (1975).
- 5 Mazzotti L.: Ausencia de emanaciones odoriferas perceptibles en *Dipetalogaster maximus*. Algunos comentarios sobre esta especie. *Rev. Inst. Med. trop. S. Paulo* 12, 320–324 (1970).
- 6 Pattenden G., Staddon B. W.: Identification of isobutyric acid in secretions from Brindleys scent glands in *Rhodnius prolixus*. *Ann. ent. Soc. Amer.* 65, 1240–1241 (1972).
- 7 Schofield C. J., Upton C. P.: Brindleys scent glands and metasternal scent glands of *Panstrongylus megistus*. *Rev. bras. Biol.* 38, 665–678 (1978).

