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PETER FROMHERZ

Physikalisch-Chemisches Institut der Universität Marburg, and Max-Planck-Institut für Biophysikalische Chemie, Göttingen

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Attraction of Triatomine Bug Vectors of Chagas's Disease to Betalights

APART from the improvement of housing standards as circumstances permit, the control of Chagas's disease throughout its range in South and Central America depends on control of the vectors (domestic triatomine bugs) by periodic indoor application of residual insecticide, usually HCH. Bug infestation in the low standard dwellings which are characteristic of urban and rural foci of the disease is usually discovered by daytime search for bugs in the cracks and crevices of walls and other indoor surfaces where the insects hide during the day. Pyrethrum powder is often blown into such fissures to irritate the bugs and cause them to emerge[1], and some workers also sample by attaching perforated boxes containing crumpled paper to walls, when the chance lodgment of bugs in the boxes may indicate infestation[2]. The economic management of vector control requires more reliable and less time-consuming sampling methods[3] and there is also a need for better quantitative data on bug densities in relation to clinical and epidemiological aspects of the disease.

It is therefore relevant that light attracts these nocturnal bugs. Sylvatic species, commonly living in palms and other arboreal environments, sometimes enter lighted dwellings[4] or are attracted to lighted roadways[5] and to ultraviolet light in outdoor traps[6,7]. Some preliminary laboratory investigations on the attraction of *Triatoma maculata* to betalights are described here. Betalights, discussed elsewhere as attractants in mosquito larval traps[8], give out no heat and glow continuously for years without attention or the need for electrical or any other extraneous source of power. They are available in different shapes, colours and sizes, and the findings described here suggest that they may be useful attractants in traps for triatomine bugs.

Bugs were released into an opaque white polyethylene sandwich box (30.5 × 20.3 × 7.6 cm) with, at each end on the mid-line, a semitransparent polyethylene spray bottle (7.6 cm × 4.5 cm in diameter) screwed, after discarding the stopper, into a hole cut about 0.5 cm above the floor of the chamber. One bottle—the betalight trap—had a spherical (10.9 mm diameter) green betalight of 2,000 microlamberts luminance (S10/G/2000—Saunders-Roe Developments Ltd) fixed with adhesive tape to a hole in the base of the bottle. The control trap, similarly taped, was not illuminated. Damp wool slung from the chamber lid maintained humidity and filter paper on the chamber floor facilitated movements by the bugs. The apparatus was continuously in the dark at 24°–25° C except for a few seconds' exposure to light at half hourly, hourly or other intervals, when observations were made of the distribution of the bugs in the chamber and traps.

Fig. 1 summarizes, in 3 h periods, results for ten unfed male *T. maculata* released into the chamber. Their distribution in the apparatus, based on hourly observations, was recorded for 34 h consecutively. At each hourly observation any bugs in the traps were returned to the chamber. Thus, thirty bugs

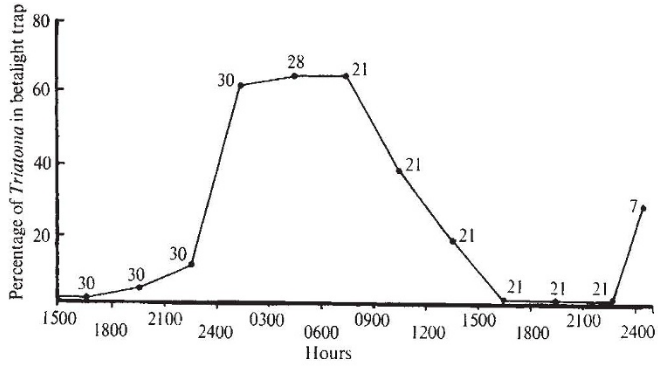

Fig. 1 Percentage of male *Triatoma maculata* entering in successive 3 h periods a green betalight trap (S10/G/2000) during a 34 h experiment carried out in darkness except for brief inspections, at hourly intervals, to record the distribution of the bugs in the central chamber, control trap and betalight trap. The number at each point is the number of bugs available in each period to be attracted to the trap. There seems to be a diel rhythm of attraction, mainly during night hours, to the betalight.

were available to be attracted in the first four 3 h periods but, owing to deaths, twenty-eight and twenty-one later, and only seven for the final hour.

Bugs were never found in the lightless control trap. In several observations between 0900 h and 1500 h, preceding the graphed data of Fig. 1, none entered the betalight trap either, although the apparatus was in darkness and the betalight glowed continuously. This inactivity continued, except in the case of a single bug in the betalight trap between 1900 h and 2000 h, until between 2100 h and 2400 h when 9.9% of the bugs entered the betalight trap. Attraction to this trap then rose rapidly to 61% and persisted about this level for most of the night before declining steadily to zero by 1600 h on the following day. Attraction was not apparent again until the final hour of observation, 2400–0100 h. In another experiment, there was no catch of male *T. maculata* in either trap from 1200 h to 2130 h followed by catches, only in the betalight trap, from 2200 h to 0930 h, with a maximum catch between 0230 h and 0300 h. A diel rhythm of attraction to betalights, particularly during night hours, appears to be involved. In other experiments, weaker betalights in red (40 microlamberts), blue (90 microlamberts) and white (200 microlamberts) attracted male, female, and late larvae of *T. maculata* in 50–70% of trials. Further investigations of betalights as convenient attractants in traps for triatomine bugs are in progress.

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D. S. BERTRAM

Department of Entomology, London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, London WC1E 7HT

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