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Research Note

A PRELIMINARY STUDY OF VECTOR CONTROL WITH POLYSTYRENE BEADS IN RECIFE, BRAZIL

ZULMA MEDEIROS; GERUSA DREYER; LUIZ ANDRADE & MARIA LUIZA PIRES

Centro de Pesquisas Aggeu Magalhães -- FIOCRUZ - Caixa Postal 7472, 50722-970 Recife, PE, Brasil

Lymphatic filariasis has long been a public health problem in Brazil and it is now believed that only two cities remain endemic for *Wuchereria bancrofti* infection, Recife and Belém, even though autochthonous microfilaremic individuals were detected in the city of Maceió recently (G. Dreyer et al., 1991, *Mem. Inst. Oswaldo Cruz, 86:* 495-496). In Recife, northeast Brazil, a disease control program developed by the National Foundation of Health (FUNASA) has attained mainly to the search of microfilaremic individuals and their treatment. Up to now, little has been done in relation to the vector population of the area, which consists basically of *Culex quinquefasciatus* (G. Dreyer & Z. Medeiros, 1990, *Ciência Hoje, 12:* 6-7). Experiments throughout the world (WHO, 1987, *Control of lymphatic filariasis: a manual for health personnel,* p. 33-48) has shown that an integrated drug and vector control program appears to yield more beneficial results than an isolated approach. This is particularly true when *Culex* species are responsible for disease transmission because even low microfilariae density carriers are able to induce successful larval development in mosquitos (B. Carme, 1979, *Am J. Trop. Med. Hyg., 28:* 53-55). Vector control with polystyrene beads has already been tried in Africa (C. A. Maxwell et al., 1990, *Trans. R. Soc. Trop. Med. Hyg., 84:* 709-714) and India (R. C. Sharma et al., 1985, *Indian J. Malar., 22:* 107-109) with good results. The method is based on the application of a floating layer with the expanded forms of these beads (2 mm in diameter) on water to prevent egg laying and mosquito hatching.

A preliminary study with this method was carried out in Recife by the authors from June 1988 to July 1990. One household was subject to close monitorization with an exit trap to catch adult mosquitos emerging through the cess pit apertures and a light trap placed inside the bedroom. Bednets were daily used by the family throughout the study period to avoid competition of the light trap with the sleepers. Mosquitos counts from the two traps were made before and after dropping the polystyrene beads on to the water surface of the cess pit. No other breeding place was identified within house limits and cess pits were the only important breeding sites of the proximity. After a total count, captured mosquitos were classified as males, normal females, gravid females and nourished females. Table shows pre-treatment profile of both traps.

TABLE

Pre-treatment mosquito trap profile

Trap	Male/Female	Gravid	Nourished	Total
Cess pit	905	8	3	916
Bedroom	815	0	0	815

A follow-up study on the number of mosquitos captured over both traps showed a remarkable decrease after 48 h the beads were applied. Progressive analysis revealed no mosquitos within one year and very few after the two years of investigation (Fig.). As expected, an equivalent decline was observed among the gravid females, nourished females, normal females and males groups. It is important to emphasize that after six months the house was free of mosquitos even though the neighbourhood remained with an unchanged vector population, suggesting that mosquitos may prefer their own indoor habitat in certain conditions. However, mosquitos captured by the bedroom trap increased slowly while none were being captured at the cess pit (Fig.). This can be explained by the fact that mosquitos from other breeding places could have migrated to the house being investigated in a time de-

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pendent fashion, as evidenced by the reappearance of indoor mosquitos after two years, still in a low number. All other possible factors that might have influenced the mosquito density inside the house were discharged (inseticides, door and window screens). A long observation period was important to evaluate the efficacy of polystyrene beads during the rainy season, when an increase of vector population is expected. In this study, the method proved to be yearlong efficient, corroborating with the work of C. F. Curtis et al. (1989. Insect proofing of sanitation systems, p. 173-186. In C. F. Curtis, *Appropriate technology in vector control.* CRC Press, Florida) which demonstrated that pits remain mosquito-free for at least five years unless they flood.

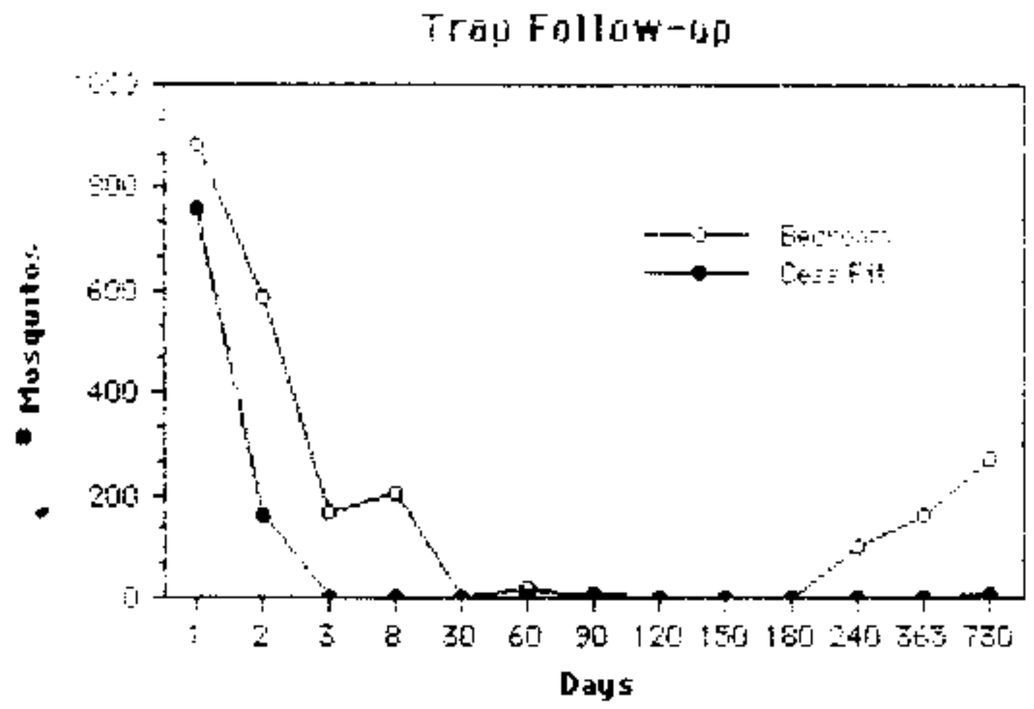

Figure shows follow-up results of both mosquito traps after cess pit treatment with polystyrene beads. A sharp decrease in the number of captured mosquitos is observed (see text).

An important epidemiological aspect of vector control monitoring in lymphatic filariasis is the human biting rate which can be indirectly measured by capturing mosquitos with light traps (C. F. Curtis, personal communication). It is possible to assume from this preliminary investigation that human biting rate can be reduced with the use of polystyrene beads in breeding places of *C. quinquefasciatus.* In fact, a larger study on vector control in Great Recife with this method is currently being conducted by L. Regis et al. (personal communication). Throughout the tropical world, vector control has not been an easy task in that it depends greatly on urban sanitation and political decision to do so. Since developing countries are the most affected by mosquito-borne diseases, cost/benefit is a crucial aspect in this decision-making process. Among the methods already used for vector control, polystyrene beads have matched both efficacy and the low-cost demands.

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