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Research Note

Phenothrin impregnation of wide-mesh net for protection from biting mosquitoes*

Takeshi KURIHARA,** Kiyoshi KAMIMURA*** and Ryo ARAKAWA***

** *Department of Parasitology, Teikyo University School of Medicine, Kaga, Itabashi, Tokyo 173, Japan*

*** *Department of Pathology, Toyama Medical and Pharmaceutical University, Toyama 930-01, Japan*

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The use of insecticide-treated wide mesh net has been tested for protection from biting mosquitoes. Two different meshes of nylon fishing net were chosen: in one the aperture size was 40×40 mm, and the other 10×10 mm. Neither net formed a physical barrier to mosquitoes passing through. The size of thread is 0.4 mm for both nets. The insecticide used was phenothrin, which is well known for its low human toxicity, was applied at a dosage of 0.5 g per m^2 or per 19.6 g of the large mesh net or per 25.6 g of the small mesh. The experiment was carried out at a very large pigsty, surrounded by rice fields in Toyama Prefecture during early August 1984.

Four sections of the pigsty, 3×4 m, each containing 5 to 6 pigs and a light trap hanging 1.7 m from the floor, were surrounded with "walls" of net curtain 1.8 m high but without netting "roof." The roof of the sty was 4–6 m high. In two sections of the sty insecticide-treated net at 3 weeks after impregnation was used, and in the other two sections untreated net of the large mesh or small mesh was used. In the fifth section a light trap was operated without netting. The five light traps were located at least 7 m apart. The effect of impregnated net on mosquito biting was determined by comparing the catches of adult mosquitoes in the light-traps with or without treated or untreated nets.

The light traps were operated from 17:00 hr and the mosquitoes were collected at 05:00 hr. The female mosquitoes were examined at 10:00 hr and separated to those dead or alive and to those fully fed or unfed. The results of these collections, compiled for two nights, are shown in Table 1.

More than 99% of the mosquitoes collected were female *Culex tritaeniorhynchus*. There was little difference in total number of mosquitoes collected between the sites without a net and with untreated nets. Thus it appears that the untreated netting had little effect on the accessibility of the mosquitoes to the baits. The total number of mosquitoes collected in the trap surrounded by the treated small mesh net was much less than a half of that from the untreated nets, though the number collected from the treated large mesh net was more than those of the untreated nets. However, both of the treated nets reduced the proportion of surviving mosquitoes to a negligible level and they also greatly reduced the proportion of fed mosquitoes.

It has previously been demonstrated in laboratory tests that phenothrin impregnation reduced both the number of mosquitoes passing through a net and the feeding activity of mosquitoes (Kurihara *et al.*, 1985). Impregnation of bed nets of fine mesh with permethrin was also effective against malaria mosquitoes (Curtis and Lines, 1985; Darriet *et al.*, 1984). However, a wide-mesh net curtain, which has an aperture size so large that ventilation of the room is not obstructed, may be more acceptable to people in the hot and humid areas, where mosquito

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** 栗原 毅: 帝京大学医学部 (〒173 東京都板橋区加賀)

*** 上村 清, 荒川 良: 富山医科薬科大学医学部 (〒930-01 富山市杉谷)

Table 1 Comparison of two nights' mosquito collections from light traps surrounded by phenothrin-impregnated nets, untreated nets or no net.

Net	Mesh[1]	Live mosquitoes		Dead mosquitoes			Total	% Fed[2]	% Survived
		Fed	Unfed	Fed	Unfed	Unclassifiable			
Phenothrin treated	Large	22	1	1,550	3,563	246	5,382	30.6	0.4
	Small	83	9	519	937	113	1,661	38.8	5.5
Untreated	Large	1,342	75	1,640	646	284	3,987	80.5	35.5
	Small	954	47	2,903	1,188	269	5,361	75.7	18.7
Without net	—	1,228	131	2,897	1,559	493	6,308	70.9	21.5

[1] Large mesh 40×40 mm, small mesh 10×10 mm. [2] No. fed mosquitoes/all fed and unfed mosquitoes.

borne diseases are endemic. Previously wide-mesh net treated with repellent has been evaluated with encouraging results (McDonald and Grothaus, 1973; Grothaus *et al.*, 1974). It seems that a net curtain of the type used in the present experiments or curtains over the windows or other entrances to a room would be easy and economical for widespread introduction by antimalaria personnel as an alternative to the indoor spraying of residual insecticides.

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摘　要

フェノトリン処理網を用いた蚊防除試験

網目の大きさが 10×10 mm, または 40×40 mm のナイロン製漁網に, フェノトリンを 0.5 g/m² 浸みこませ乾燥させ, この網で高さ 1.8 m の壁を作り, 広さ約 3×4 m を囲む. 囲み内に数頭の豚と, 高さ 1.7 m に吊るしたライトトラップを設置し, 一晩放置し翌朝トラップ内のコガタアカイエカを回収調査した.

捕集蚊総数では網で囲んでいない「トラップだけ」には及ばないが, 40 mm の処理網で囲んだ場合と, 10 mm の無処理網では多数で, 10 mm の処理網では極度に少なかった. 網自体が蚊侵入を妨げる要因は, 強くはないようだ. しかし規定時間に調査した, トラップ回収生存蚊の比率は, 両方の処理網ではともに無視しうるほど少ない. 吸血蚊の比率も同様に, 処理網では, 他と比してはるかに低率であった. 蚊媒介病流行地での人家内利用を期待している.