sharpener needles inserted into wooden applicator sticks (Patton and Evans, 1929) Excision of the maxillary palpi and/or the proboscis, partially or completely, was done with microscissors (Jones, 1949). Before and after excision, the mouthparts were cleaned with saline (Ephrussi and Beadle, 1926), buffered with M/150 potassium phosphate to pH 6.8 (Bradford and Ramsey, 1949). The mosquitoes were then held at 85% percent relative humidity, 25° C. for postoperative recovery of one day, (Wellington, 1949).

References


Field Tests of B+V Net Treated with Repellents to Prevent Mosquito Bites

H. K. Goock, 1 and M. A. Moura 2

Bed nets are used as protection against the attack of mosquitoes particularly in areas where mosquito-borne diseases are prevalent or populations of mosquitoes are extremely high. Recent research (Goock et al., 1967) showed that 2-mesh-per-inch cotton netting treated with repellents gave a high degree of protection against the black salt-marsh mosquito, Aedes taeniorhynchus Wiedmann. Bed nets made from wide-mesh netting to permit better air passage but treated with repellents to exclude mosquitoes, could be very useful and more satisfactory than the standard bed net. Therefore, from August to December, 1966, we tested similar repellent-treated bed nets in Bangkok, Thailand against natural populations of Culex pipiens quinquestriatus Say and Aedes aegypti (L.).

The bed nets were made of 2-mesh-per-inch pressed cotton netting treated at a rate of 0.5 g of net or M-1960 (a mixture of 50 percent benzyl benzoate, 30 percent N-buty11,3-propanediol, and 10 percent emulsifier) per 1 g of netting. All tests were made in 2 houses in the Klong Toey section of Bangkok. One set of nets A (treated with M-1960) and one set G (treated with diet) were used between 7 and 9 a.m. for tests against C. p. quinquestriatus; another set E (treated with M-1960) and a fourth set F (treated with diet) were used between 1 and 3 p.m. for tests against 1

1 These tests were made in cooperation with Lt. Col, John E. Scanlon, Walter Reed Army Institute of Research, and Dr. Douglas J. Gould of the U. S. Army Medical Component, SEATO, APO San Francisco 96316.


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Table 1.—Mosquitoes collected within treated and untreated bed nets inside a house in the Klong Toey section of Bangkok, Thailand.

<table>
<thead>
<tr>
<th>Month of date</th>
<th>No. tests</th>
<th>C. p. quinquefasciatus</th>
<th>A. aegypti</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M-1960 (A)</td>
<td>Dect (G)</td>
<td>Untreated</td>
</tr>
<tr>
<td>Aug.</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sept.</td>
<td>4</td>
<td>..</td>
<td>..</td>
</tr>
<tr>
<td>Oct.</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Nov.</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dec. 6</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Dec. 13</td>
<td>8</td>
<td>..</td>
<td>0</td>
</tr>
<tr>
<td>Dec. 20</td>
<td>1</td>
<td>..</td>
<td>3</td>
</tr>
</tbody>
</table>

* Nets A and G treated Aug. 16; nets E, Aug. 17; and nets F, Aug. 19, 1966.

A. aegypti. These periods were chosen because the two species were known to be actively seeking human hosts for blood meals at these hours.

The tests were made by placing the 2 sets of treated bed nets and 2 sets of untreated bed nets in position shortly before the test period. Then two subjects sat within each set of nets for the 2 hours of the test and collected all mosquitoes that entered. These mosquitoes were then counted and identified. When the nets were not in use (between tests), they were hung in the house. Each set of nets was tested once a week until mosquitoes entered the treated nets.

The data are summarized in Table 1. The numbers caught in the untreated sets showed that both species of mosquitoes were actively seeking human hosts during the test period. The average number of adult female, C. p. quinquefasciatus, collected in 2 hours within the untreated bed nets ranged from 22 to 36; the average number of female A. aegypti ranged from 8 to 16. The bed net treated with deet provided complete protection for 17 weeks against C. p. quinquefasciatus and for 16 weeks against A. aegypti. The bed net treated with M-1960 provided complete protection against both species for 15 weeks.

Literature Cited


A Gyandromorph of Culicoides lausei Khalf (Ceratopogonidae: Diptera)¹

Shahin Navai ²

In Culicoides, interspecies have been recorded from nine species (Callet, 1959; Callot and Kremer, 1963; Derefarov, 1960; Navai and Mesghali, 1969; Smith, 1966 and Smith and Perry, 1967) but so far gyandromorphs have been recorded from only three species (Curtis, 1962 and Hawkin, 1963). Herein is a record of a gyandromorph of Culicoides dactylopus Khalif which has not been described previously.

Four specimens of the gyandromorph were collected in the Caspian littoral. Two were collected on July 11, 1964 in Sari, Iran, together with 10 normal females and 9 normal males in a light trap. The other two were collected on August 25, 1967 in Shirud, Iran, together with 17 normal females and 5 normal males.

The gyandromorphs exhibited female characteristics in the wings and abdomen (Fig. 2), Spermatozoa were definitely present and were of the same size as those of the normal female. No eggs were present in the ovary. The head of the

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