SHORT COMMUNICATION

Dengue 2 Outbreak in Southeastern Senegal During 1990: Virus Isolations from Mosquitoes (Diptera: Culicidae)

MOUMOUNI THAORE-LAMIZANA,1 HERVE ZELLER,2 ERIC MONLUN,2 MIREILLE MONDO,2 JEAN-PAUL HERVY,1 FRANCOIS ADAM,1 AND JEAN-PAUL DIGOUTTE2

ABSTRACT During 1990, Dengue-2 (DEN-2) virus was isolated for the first time from mosquitoes (Aedes furcifer, six isolates; Ae. taylori, six isolates; Ae. luteocephalus, seven isolates) collected during an epidemic in which DEN-2 virus also was isolated from humans. Numerous isolations have been made previously from mosquitoes in the absence of human infection. In Senegal, DEN-2 virus appears to be maintained in an enzootic cycle and therefore, plays an expanding role in human disease and increases the need for effective surveillance in mosquito populations.

KEY WORDS Dengue 2, Aedes, Senegal.
Fig. 1. Dengue-2 vector abundance (females/person hour and rainfill 1) in Kedougou area, 1990.

In total, 18,534 mosquitoes in seven genera and 50 species were collected in 1990 and processed in 375 pools. Aedes mosquitoes represented 42% of the total of mosquitoes collected (Table 1). Stegomyia and Diceromyia were by far the most anthropophilic; 20% of the total mosquitoes were Diceromyia, 13% Aedimorphus, and 8% Stegomyia. Adults from five other genera also were collected and processed for virus with negative results; Anopheles (10 species, 2,500 females in 69 pools), Aedeomyia (2 species, 15 females in 5 pools), Culex (9 species, 1,397 females in 47 pools), Mimonzyiu (6 species, 392 females in 11 pools), Uranotaenia (5 species, 266 females in 12 pools) and Mansonia unifomis (4,601 females in 52 pools).

In June, at the beginning of rainy season, the Aedimorphus mosquitoes constituted 60% of the total females, of which Ae. vittatus comprised 26% and Ae. dalzieli 10%. Stegomyia mosquitoes were 14.6% of the total females and included 53% Ae. luteocephalus and 43% Ae. aegypti (L.) as well as Ae. ufricunus (Theobald), Ae. neoufri-canus (Cornet) and Ae. opok (Corbet and Van Someren). Overall, Ae. furcifer (30.4% of the total mosquitoes) was the dominant species collected at human bait, ranging from 20.3% in June to 38.7% in November. The mean landing rate per person hour indicated that Ae. furcifer was least abundant at the beginning of the rainy season (2.5 females/person hour) and most abundant after the rainfall peak (9.5 females/person hour). The maximum number of Ae. luteocephalus and Ae. tuylori were collected in September and November respectively.
Fig. 2. Map showing capture sites. 1, Forest gallery at ground level. 2, 4, 6, Forest gallery with platforms 4 m high. 3, Forest gallery with platform 10 m high. 6, Savanna aren.

Seventeen DEN-2 isolates were obtained during the September-November period (Table 1) from 32% of Ae. juvencifer pools tested: 23% of Ae. taylori and 30% of Ae. luteocephalus. These three species comprised 45% of the total pools tested. The minimal field infection rate was 2.5
per 1,000 females tested for Ae. furcifer, 4.8 for
Ae. taylori, and 5.2 for Ae. luteoccephalus. The
first DEN-2 isolate was recovered from Ae. luteo-
ccephalus at site 2 in September. In October
DEN-2 virus was obtained from Ae. luteocepha-
clus at sites 2 and 3 (two isolates). In November
the virus was isolated at all sites from Ae. luteoce-
cephalus (sites 1, 3, 4, and 6), from Ae. furcifer
sites 2, 3, and 6), and from Ae. taylori (sites 4, 5,
and 6). Other flaviviruses were isolated in June;
three isolates of Kedougou virus from Ae. dalzieli
four isolates) and from Ae. aegypti (one isolate),
one isolate of Bagaza virus from Culex perfuscus
vaccin cycle could exist similar to yellow fever
virus involving monkeys and Aedes mosquitoes;
however, a sylvan cycle has yet to be established
for DEN-2 virus and considerable research is
necessary to determine the role of monkeys in
virus maintenance.

Acknowledgments
We gratefully thank M. Diallo, S. Ba, and G. Bian-
kinche for their technical assistance and W. Bakesfield
and P. Roussillon for reviewing the manuscript. This
work was supported by the Institut Pasteur de Dakar.

Table 1. Aedes collected in the Kedougou area in 1990, pools tested, and dengue-2 virus isolations

<table>
<thead>
<tr>
<th>Genus</th>
<th>Species</th>
<th>June</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aedes</td>
<td>furcifer</td>
<td>245 3</td>
<td>838 9</td>
<td>251 3</td>
<td>1,030 11</td>
<td>2,564 26</td>
</tr>
<tr>
<td></td>
<td>taylori</td>
<td>57 3</td>
<td>411 6</td>
<td>171 2</td>
<td>617 8</td>
<td>1,255 19</td>
</tr>
<tr>
<td></td>
<td>luteoccephalus</td>
<td>93 4</td>
<td>770 9</td>
<td>518 3</td>
<td>275 7</td>
<td>1,353 23</td>
</tr>
<tr>
<td></td>
<td>aegypti</td>
<td>77 3</td>
<td>25 3</td>
<td>14 2</td>
<td>45 7</td>
<td>161 15</td>
</tr>
<tr>
<td></td>
<td>univittatus</td>
<td>3 1</td>
<td>2 1</td>
<td>5 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>cozii</td>
<td>3 1</td>
<td>1 1</td>
<td>4 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>neofricanus</td>
<td>1</td>
<td>1</td>
<td>6 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>opok</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aedes</td>
<td>citatus</td>
<td>524 6</td>
<td>219 4</td>
<td>113 2</td>
<td>69 7</td>
<td>925 19</td>
</tr>
<tr>
<td></td>
<td>dalzieli</td>
<td>294 3</td>
<td>212 4</td>
<td>82 2</td>
<td>721 10</td>
<td>1,959 19</td>
</tr>
<tr>
<td></td>
<td>cumminii</td>
<td>2 1</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>argenteopunctatus</td>
<td>300 5</td>
<td>11 2</td>
<td>5 1</td>
<td>316 8</td>
<td></td>
</tr>
<tr>
<td>Aedes</td>
<td>sp.</td>
<td>104 9</td>
<td>16 3</td>
<td>27 3</td>
<td>147 15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 1,208 25 2,870 49 1 (1) 878 19 2 (2) 2,805 58 (16) 7,769 151 (19)
July 1994 TRAORE-LAMIZANA ET AL.: ISOLATIONS OF DENGUE-2 VIRUS FROM MOSQUITOES 627


