

Mansonia crassipes, a Vector of Bird Filarioids in Ceylon

by

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Two types of bird filarioids were reported in *Mansonia crassipes* by Niles, Fernando and Dissanaïke (1965). Of the two types reported, one has been identified as *Cardiofilaria nilesi* (Dissanaïke and Fernando, 1965), while the other has been found to be an undescribed species of *Pelecitus* (Dissanaïke, 1966) and awaits further study. Recent investigations have shown that *C.nilesi* and *Pelecitus* sp. are particularly common in *M.crassipes* which are resting out of doors. This paper summarizes the results of investigations carried out for one year in Hokkandara, where some infected *M.crassipes* were found earlier in a preliminary survey.

AREA AND METHODS

The area covered by the investigations is rich in avian fauna. The land is flat with wide stretches of grass-field and large tracts of open swamp covered with profuse growths of water-plants. *M.crassipes* breeds freely in the open swamps. A wide variety of filarial infections are known to occur in domestic and wild birds in this area.

Natural harbourages were simulated to get concentrations of mosquitoes resting outside at more accessible points but this method proved unproductive. However, fairly large numbers of *M.crassipes* were collected gradually by direct searches in dense grass and other low-lying vegetation. Mosquitoes were not held in the laboratory for long but were dissected within a few hours of capture to determine the intensity of larval infections.

RESULTS

Outdoor resting places

Adults of *M.crassipes* were found resting by day low down at the bases of small shrubs and rough grasses growing beneath the shade cast by large trees. Several of them were found blood-fed. Examination of blood from some freshly engorged specimens showed nucleated red cells indicating that *M.crassipes* was not feeding on mammals. Birds appeared to be the preferred hosts. Cattle-baited traps yielded very few adults of *M.crassipes* and the results with human-baited traps made it clear that *M.crassipes* was little attracted to man. It seemed evident that at this place the majority of *M.crassipes* preferred to feed and rest out of doors. Regular outdoor collections of *M.crassipes* from natural resting sites were made over a period of one year. In the process other species were also found but *M.crassipes* was predominant, constituting over 80 per cent. of the total catch. The results are summarized in Table I.

TABLE 1

Showing the numbers of mosquitoes caught resting in vegetation
(253 searches over 1 year).

Species	No. caught
<i>Mansonia</i>	
<i>crassipes</i>	623
<i>uniformis</i>	37
<i>annulifera</i>	4
<i>Aedes</i>	
<i>albopictus</i>	46
<i>Armigeres</i>	
<i>subalbatus</i>	3
<i>Culex</i>	
<i>gelidus</i>	4
<i>tritaeniorhynchus</i>	5
<i>fuscus</i>	5
<i>Anopheles</i>	
<i>peditaeniatus</i>	3

Intensity of larval infections

Nearly all the mosquitoes caught were dissected and examined for the presence of filaria larvae. The larval forms of *C.nilesi* and *Pelecitus* sp. are quite distinct and can be easily differentiated in the mosquito phase. The dissection results are summarized in Table 2. *M.crassipes* was the only mosquito regularly found infected with *C.nilesi* or *Pelecitus* sp. giving an infection rate of 3.7 and 4.0 per cent, respectively. Infections in *M.crassipes* were found continuously throughout the observation-period, even during months when the prevalence of this mosquito was very low. The infections increased greatly in July and August coincidental with a sharp rise in mosquito prevalence. Mixed *Cardiofilaria* and *Pelecitus* infections in the same mosquito were not uncommon.

TABLE 2

Showing the filarial infections found in mosquitoes caught from outdoor resting sites.

Species	No. dissected	Infected with larvae of		C.nilesi infection rate	Pelecitus sp. infection rate	Average No. of mature larvae per infective mosquito	
		C.nilesi	Pelecitus sp.			C.nilesi	Pelecitus sp.
<i>Mansonia</i>							
<i>crassipes</i>	602	22 (17)*	24 (21)	3.7 (2.8)	4.0 (3.5)	5	65.3
<i>uniformis</i>	35	—	—	—	—	—	—
<i>annulifera</i>	4	—	—	—	—	—	—
<i>Aedes</i>							
<i>albopictus</i>	43	—	—	—	—	—	—
<i>Armigeres</i>							
<i>subalbatus</i>	3	—	—	—	—	—	—
<i>Culex</i>							
<i>gelidus</i>	4	—	—	—	—	—	—
<i>tritaeniorhynchus</i>	5	—	—	—	—	—	—
<i>fuscus</i>	5	—	—	—	—	—	—
<i>Anopheles</i>							
<i>peditaeniatus</i>	3	—	—	—	—	—	—

* Numbers in brackets indicate mature infections.

A greater proportion of infected *M. crassipes* harboured mature larvae indicating that active transmission was taking place. In a total of 602 *M. crassipes* dissected, 17 showed infective larvae of *C. nilesi* and 21 showed infective larvae of *Pelecitus* sp. giving a mature-larva rate of 2.8 and 3.5 percent, respectively. The maximum number of mature larvae of *C. nilesi* seen in a single mosquito was 17 with an average of 5 per mosquito. But in infections of *M. crassipes* with *Pelecitus* sp. unusually large numbers of mature larvae were found. The largest number of mature larvae of *Pelecitus* sp. counted in a single mosquito was 293 with an average of 65 per mosquito. Such high densities of filaria larvae are rarely encountered in wild-caught mosquitoes.

DISCUSSION

There are hardly any references in the literature to natural infections of mosquitoes with bird filarioids. *Mansonia* sp. belonging to the subgenus *Coquillettidia* show a strong predilection for bird blood (Williams, Weitz and McClelland, 1958; Wharton, 1962; Niles, 1963), and may be much more involved in the transmission of bird filarioids than is generally considered. *M. crassipes* is the only representative of this subgenus known to occur in Ceylon and on the present evidence appears to be the principal, if not the only, vector of *C. nilesi* and *Pelecitus* sp. of birds. Further studies may show that related filarial species occur in birds in Ceylon and that they are also transmitted by mosquitoes.

In these investigations an unusual finding was the presence of a large number of mature larvae of *Pelecitus* sp. in *M. crassipes* at the time of capture. On several occasions more than 100 mature larvae were seen in a single mosquito and on an average there were 65 mature larvae per mosquito. There are no available records to show that mosquitoes pick up infections as large as this in nature. The adverse effects of high densities of filaria larvae in mosquitoes are well known. Wharton (1957) has shown in the laboratory that few mosquitoes with large numbers of larvae survive when the larvae are reaching maturity and it was estimated that 50 larvae per mosquito was near the lethal limit.

SUMMARY

1. Adults of *M. crassipes* were found resting by day low down at the bases of small shrubs and rough grasses growing beneath the shade cast by large trees.
2. Dissections of wild-caught mosquitoes indicated that *M. crassipes* was the principal vector of *C. nilesi* and *Pelecitus* sp. of birds.
3. High densities of mature larvae of *Pelecitus* sp. were observed in *M. crassipes* at the time of capture.

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