

Epidemiology of *Mansonella perstans* filariasis in the forest region of South Congo

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geometric mean. In order to detect dermal mf, 118 skin snips were taken from adults selected at random (41 Pygmies, 77 Bantus). Double skin biopsies were taken from the iliac crests and placed in 50  $\mu$ l of normal saline, and four hours later a drop of formaldehyde was added. Specimens were transported to the laboratory, where emerged mf were identified.

A survey of anthropophilic *Culicoides* was carried out in April 1987 (diurnal and nocturnal species) and January 1988 (diurnal species), for a total of 11 capture days. The *Culicoides* were collected with a mouth aspirator, preserved in 70% alcohol, and then mounted for taxonomic studies (Cornet, 1974). The diurnal species were caught in the morning between 07.00 and 09.00 hours and in the evening between 17.00 and 19.00 hours, and the nocturnal species were caught between 23.00 and 01.00 hours. Some 629 of the dominant species of *Culicoides* were anaesthetized with ether, then dissected in order to detect *Mansonella* larvae (Sharp, 1928). The lacerated fly tissue, fixed in human serum, was stained with acid haemalum.

## RESULTS

The prevalences of *M. perstans* mf carriers, and the mean microfilarial densities, are shown in Table 1. The prevalence rate was 80.6% in the Pygmies and 26.2% in the Bantus. No difference was observed according to sex. In the Pygmies the maximum rate was reached early (age group 10–19 years), whereas it increased with age throughout life in the Bantus. The m.d. were 136 mf ml<sup>-1</sup> in the Bantus and 1213 mf ml<sup>-1</sup> in the Pygmies. In the Pygmies the densities increased regularly with age, and were twice as high in the women as in the men (1595 v. 685 mf ml<sup>-1</sup> of blood). In the Bantus, however, the densities were slightly higher in men than in women (160 v. 110 mf ml<sup>-1</sup> of blood).

TABLE 1  
*Distribution and microfilarial load of Mansonella perstans by age and sex among Bantu and Pygmy inhabitants of Missama*

Age (years)	Sex	Bantu			Pygmy		
		No.	mf+ (%)	m.d.*	No.	mf+ (%)	m.d.*
1–9	M	45	3 (6.7)	70	7	4 (57.1)	105
	F	28	2 (7.1)	140	11	7 (63.6)	280
10–19	M	32	3 (9.4)	80	20	18 (90.0)	555
	F	24	6 (25.0)	75	10	8 (80.0)	1215
≥20	M	54	24 (44.4)	210	33	27 (81.8)	1040
	F	119	41 (34.4)	115	53	44 (83.0)	2205
Total	M	131	30 (22.9)	160	60	49 (81.7)	685
	F	171	49 (28.6)	110	74	59 (79.7)	1595

\*m.d. = Geometric mean microfilarial density 1 ml<sup>-1</sup> of blood.

Only one of the 118 skin snips (0.8%) showed *Mansonella streptocerca* mf. No *Onchocerca volvulus* mf were detected.

The captures of diurnal anthropophilic *Culicoides* (Table 2) showed that *C. grahamii* was the species most aggressive to man. This species accounted for over 98% of the captures irrespective of the period. Some 0.8% of the dissected *C. grahamii* (five of 629) were carriers of indistinguishable filarial larvae of the *Mansonella* genus, including one third-stage larva. Only

TABLE 2  
*Biting densities of diurnal anthropophilic species of Culicoides*

	April 1987			January 1988		
	No.	%	F/MH	No.	%	F/MH
<i>C. grahamii</i>	1470	98.0	367.5	211	98.6	70.3
<i>C. kumbaensis</i>	8	0.5	2.0	1	0.5	0.3
<i>C. fulvithorax</i>	23	1.5	5.7	2	0.9	0.4
Total	1501	100.0	375.2	214	100.0	71.3

F/MH: no. of flies caught per man-hour.

one species, *C. rutshuruensis* (group *milnei*), was found attacking man at night, and it occurred in low densities (nine flies per man-hour).

## DISCUSSION

The clinical impact of microfilaraemia filariases is not insignificant in this region of South-West Congo (Noireau *et al.*, 1990). However, the respective role played by mansonellosis is difficult to assess because of the coexistence of loaiasis. Nevertheless, severe pathogenic effects have been reported with *M. perstans* in Zimbabwe, in areas in which mansonellosis occurs alone (Gelfand and Bernberg, 1959; Holmes *et al.*, 1969). This might be due to the particular virulence of the local strains which are morphologically distinguishable from West African strains (Duke, 1974). Unlike loaiasis, for which the percentage of mf carriers in the adult population never exceeds 35% (Fain, 1978), *M. perstans* microfilaraemia can be observed in a high percentage of the population (Kershaw *et al.*, 1953; Richard-Lenoble *et al.*, 1980; Dujardin *et al.*, 1982). In our study major differences between the Bantus and the Pygmies were observed. The exposure to the vector certainly plays an appreciable role, and might account for the earlier occurrence of microfilaraemia in the Pygmies. On the other hand, the differences in the trend of microfilarial load with age (significant increase in the Pygmies, unlike the Bantus) perhaps support the theory that microfilaraemia might be regulated genetically.

Four species of *Culicoides* which are preferentially or occasionally anthropophilic were identified in the study region. Of these species, only *C. fulvithorax* has never been reported to have played a role in the transmission of *M. perstans* (Linley *et al.*, 1983). *Culicoides grahamii*, *C. kumbaensis* (group *inornatipennis*) and to a lesser extent *C. rutshuruensis* (group *milnei*) are currently considered as vectors of *M. perstans* in Africa (Duke, 1965; Linley *et al.*, 1983). However, the respective role of these species as vectors cannot be assessed, given the lack of data on their annual cycles. Although there is a lack of knowledge regarding sources of blood meals for *C. grahamii* (man remains, nevertheless, the main host), the evidence of their infection with *Mansonella* larvae (including *M. perstans*) and their high densities in the study zone

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