

## Development of *Onchocerca volvulus* microfilariae injected into *Simulium* species from Cameroon

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**Abstract.** Microfilariae (mff) of the savanna and forest strains of *Onchocerca volvulus* (Leuckart) were injected intrathoracically into adult females of *Simulium damnosum* Theobald *sensu stricto*, *S. sirbanum* Vajime & Dunbar, *S. squamosum* Enderlein and *S. mengense* Vajime & Dunbar. Nine days post infection (pi) 27–29% of the savanna mff and 31–38% of the forest strain had developed to third-stage larvae (L3), irrespective of the fly species, size or injection dose (5, 10 or 15 mff). Savanna flies supported the development of forest *O. volvulus* better than forest flies, in contrast to the results after *per os* infections. Therefore, in these four species of the *S. damnosum* complex from Cameroon, the peritrophic membrane is considered to be the main factor limiting the success rate of microfilarial development following the ingestion of blood infections, while the fly's haemolymph and intracellular environment play minor roles.

**Key words.** Onchocerciasis vectors, *Simulium damnosum* complex, *Onchocerca volvulus* strains, intrathoracic injection, vector competence, Cameroon.

### Introduction

Microfilariae (mff) of the nematode parasite *Onchocerca volvulus* (Leuckart), which causes human onchocerciasis, seem capable of developing in virtually all blackfly species (Diptera: Simuliidae) which come to feed on man. In Africa more than twenty taxa of the *Simulium damnosum* Theobald complex are reported to be vectors of onchocerciasis (Crosskey, 1987), although there is significant variation in the proportion of ingested microfilariae that develop to the infective third-stage larvae (L3).

In Cameroon, mff of the forest strain developed much better in blackflies from the forest

than in those from the savanna and vice versa (Duke *et al.*, 1966). Within half a minute after the ingestion of a fly's bloodmeal, the epithelial cells of the posterior midgut secrete a peritrophic membrane which envelops the ingested blood (Lewis, 1953). Some of the mff manage to penetrate the membrane before it is completely hardened, but the majority are imprisoned and die (Laurence, 1966). By injection of mff into the fly's thorax the limiting effect of the peritrophic membrane can be overcome. Nevertheless, the proportion of intrathoracically injected mff that develop to L3s in nearctic or palaeartic species of *Simulium* ranges from only 2% to 28% (Reid, 1979; Ham & Bianco, 1983). By injection it is possible to examine to what extent either the peritrophic membrane or the haemolymph of the fly contributes to the observed differences in the vector competence.

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