

Effect of Temephos 20EC on Non-Target Saxicolous Fauna of a Tropical African Island River at First Treatment

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Abstract

River Musola on Bioko Island in the Republic of Equatorial Guinea was treated with temephos 20EC, a *Simulium* larvicide, in March 1999 under a pilot experiment to eradicate *Simulium damnosum* s.l. from that island. The mean density of the saxicolous macroinvertebrates prior to temephos treatment of the river was $5,946.7 \pm 2,065.7$ individuals m^{-2} . The density of macroinvertebrates observed 24 h after treatment with temephos was $4,062.2 \pm 2,588.0$ individuals m^{-2} , indicating 31.7% reduction in the density of the population. There was 100% reduction in density of Odonata, Hydroptilidae, Ecnomidae, Leptoceridae and Tanypodinae in the post treatment samples. Baetidae and Orthocladiinae were affected significantly by temephos ($P \leq 0.1$). Whereas impact of temephos on *Cheumatopsyche digitata* (Trichoptera: Hydropsychidae) was marginal (-16.7%), there was complete loss of *C. falcifera* (100%) from the river, following treatment with the larvicide, indicating differential response to the larvicide by these sympatric species. In general, 'Filtering Collectors' (73%) dominated the saxicolous biocoenosis prior to treatment with temephos. However, no 'Grazers' or 'Scrapers' were present in the saxicolous community of the section of the river studied during the pre-treatment period. The 100% reduction in density observed for many taxa in the biocoenosis, in the immediate post treatment period was attributed to the low discharge of the river and the low population densities of the various taxa observed at the time of the experiment, as well as the extremely heterogeneous nature of the river bottom. It is proposed that the gallery forests be maintained to aid conservation of the faunistic diversity of the river.

Introduction

Onchocerciasis is a filarial worm infestation that eventually leads to blindness in many rural communities in Africa, the Middle East and Central America. The presence of the disease has led to desertion of fertile agricultural lands in river valleys, incapacitated productive segments of rural populations and plunged many communities below the poverty line (WHO, 1985). The World Health Organisation (WHO) started a vector control programme in West Africa in 1974 to break the cycle of transmission of the disease. Under the programme, temephos was applied to the breeding sites of the vector fly, *Simulium damnosum*, at weekly intervals, and this reduced the incidence of new infections of

onchocerciasis in West Africa by 99% (WHO, 1994). Thus, the risk of infection is currently low in areas where onchocerciasis is under control (Anon., 1999).

Following from the success of the Onchocerciasis Control Programme (OCP) in West Africa, WHO commenced control programmes in other African countries where onchocerciasis is endemic. One of the countries targeted by WHO under the African Programme for Onchocerciasis Control (APOC) was the Republic of Equatorial Guinea. The APOC aims at eradicating onchocerciasis from Bioko Island through the elimination of the vector fly, *S. damnosum*. While temephos, the choice chemical larvicide used in the control of *S. damnosum* on Bioko Island, is known