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## ENDOSULFAN SPRAYING AGAINST TSETSE

Sir,

A. H. Green and J. A. Sayer (*Malimbus* 1: 14-28) refer to helicopter application of residual endosulfan to gallery forest habitat of tsetse flies (*Glossina* spp.) in the Niger section of the 'W' National Park, and discuss possible adverse effects of the treatments on insectivorous and fish-eating birds.

The operation referred to was carried out by the Niger Government, with financial support from the United Nations Development Programme and with the technical assistance of the U N Food and Agriculture Organisation. (I was the Chief Technical Adviser on the site.) All parties are acutely aware of the importance of minimizing damage to the environment, so consultant specialists were engaged to evaluate any effects on non-target species.

Dortland, van Elsen, Koeman and Quirijns (1977, Consultants' rept., cited in "*The environmental impact of tsetse control operations*", revised edn. in press, FAO, Rome 1980) showed that, contrary to earlier experience in Nigeria (Koeman, den Boer, de Iongh and Spliethoff, *Environ. Pollut.* 15: 31-59) very few insectivorous birds were killed. In five days intensive searching along 4 km of gallery forest they found only eight dead birds - a bee-eater, three fly-catchers, a warbler, a shrike and a weaver. Prominence-values gave little evidence of significant reductions in the numbers of birds, even for those species of which a few individuals were found dead.

Fish mortality, immediately following spraying, in tributaries with stagnant pools, was high, but no damage was observed to fish in the Niger river, which was still in high flood (February-March, 1977). Roman (1977, 1978, Consultant's reports, *loc. cit.*) showed that, in 12 months, the fish populations had been re-established in the Tapoa and Mekrou tributaries; only three species out of 45 in the Mekrou dead fish collections were not rediscovered living post-rains, and the number of living species on the Tapoa actually exceeded the number dead disclosed by the post-spraying collections one year earlier. He further postulated that annual repopulation from both up-river and down-river sources was the norm for such seasonal rivers, where drying out (and fishing out) results in the loss of practically all species each dry season.

It will thus be obvious that fish-eating birds must be able to withstand seasonal variations in food supply, presumably by migrating to other areas; so temporary reduction in fish, following tsetse spraying should not impose abnormal risks upon them. I should add that endosulfan is believed not to be cumulative in the environment and, in any case, application of this insecticide by helicopter for tsetse control is not usually repeated in the Sudan-savanna zone.

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