

Vector management is crucial for healthier farmers

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At the Global Economic Forum in Davos in January 2007, the need to improve trade with poor countries was discussed with emphasis on changing subsidies provided to farmers in Europe and North America. Even if barriers to trade are dealt with, there remains the problem of improving agricultural productivity in poor countries.

Successive governments in Africa have supported either agricultural research or extension services adequately, but there is another constraint -the health of farmers in rural areas. Africa remains affected by many diseases transmitted by insects, as well as HIV / AIDS and TB. Malaria is still a major cause of mortality -especially of young children -and morbidity, and it has been implicated in increased susceptibility to HIV infection; even those that gain some immunity to malaria and survive to become adults often have periods of recurring sickness.

The peak periods of mosquito activity occur during the wet season, which is also the peak of human effort to grow crops. In the tropical rain forest areas experiencing rain over most of the year, malaria is endemic, affecting villagers in most months, if not all the year round.

In the Sanaga valley in Cameroon, four species of *Anopheles* mosquitoes

(*A. gambiae*, *A. niij*, *A. funesius*, *A. mouchelei*) are involved in transmission of malaria. In the same area, blackflies (*Simulium damnosum*) breed in the rapids along the rivers and transmit the filarial worm (*Onchocerca volvulus*) that causes river blindness. Other problems include loa loa, another vector borne disease.

The WHO successfully carried out a 20 year programme to stop the transmission of *Onchocerca volvulus* in many West African countries involving aerial application of larvicides into rivers. Although successful in its aim of interrupting disease transmission, the adult biting flies are still present and, in areas not treated, the large numbers of blackflies that occur along the river valleys cause endless irritation to the inhabitants.

The nuisance of these flies is so great that agricultural production is limited and fishermen have to cover almost their entire body whilst fishing. With temperatures often above 30°C it is very unpleasant trying to work in such clothing.

In Cameroon, the Yaounde Initiative Foundation (YIF), a new organisation with non-government organisation (NGO) status, has started a programme aimed at improving the livelihoods of people along the Sanaga river valley by



Treating a bednet with insecticide

implementing integrated vector management.

The programme funded by the Ministry of Planning and Rural Development and Syngenta Vector Control has started in six villages bordering the Sanaga river, where YIF has trained a number of small teams -the Vector Intervention Teams (VITs) -who will be responsible for vector management within their villages. They will be monitoring the presence of Anopheline mosquitoes by using light traps alongside a person sleeping under a net (not treated with insecticide) and by having an exit trap in some houses -a device that catches blood-fed mosquitoes that try to fly out of the house after feeding.

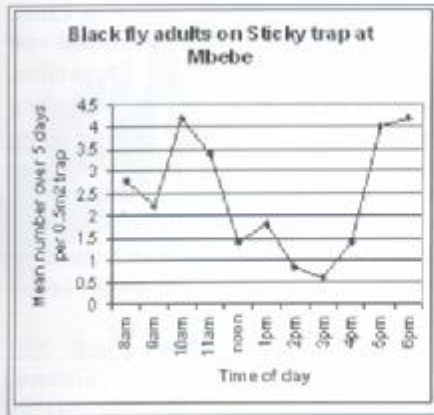
Simulium adults are monitored using clear Perspex sheets covered in a non-toxic glue while larvae will be sampled in the local rapids near the villages.

The VITs have been trained to treat the bed nets and spray houses with ICON@ CS (lambda-cyhalothrin capsule suspension) supplied by Syngenta Vector Control. The use of insecticide treated nets (ITNs) will be compared with indoor residual spraying (IRS) and in one village both these treatments will be used.

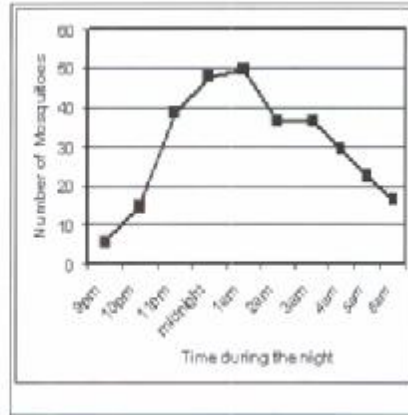
In two villages insecticides will be applied using a misting treatment either inside or outside the houses while the last village will initially have no insecticide treatment and act as a control. In one of the misting treatments, the openings in the houses and the gap between the walls and the roof will be covered by screens to prevent mosquito entry while retaining some ventilation. Distribution of the ITNs has been initially focussed on children under five and pregnant women but in this trial all beds within the ITN villages will be provided with treated nets.

Light trap set up in a house adjacent to a person sleeping under a net (Photograph Dr Terry Mabbett)





Graph B



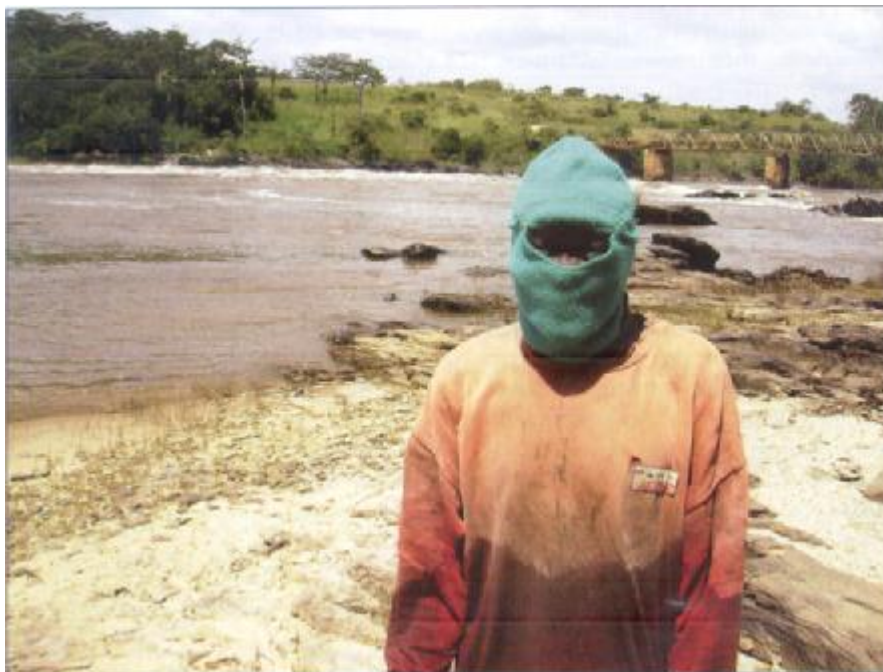
Graph A

The two graphs show A) the cycle of mosquito activity during the night followed by B) black fly activity in early morning and late afternoon.

Unfortunately there is a risk of mosquitoes becoming resistant to insecticides. The development of resistance to DDT was one of the reasons why IRS was stopped many years ago, although it is DDT being used again in several African countries. In order to mitigate the risk of resistance development, integrated vector management strategies need to be developed which both take into account the various vectors present whilst also adopting control techniques that are acceptable to the local population and designed to limit the chances of resistance developing, e.g. alternating different classes of chemistry.

Clearly while attempting to reduce the immediate problem of mosquitoes, every effort is also needed to improve the standard of housing for rural people.

Fisherman alongside the Sanaga River; Cameroon, wearing clothes to protect him from bites of Simulium damnosum -blackfly



However, even this will not solve the blackfly problem as these flies bite during the day. Much more research is needed to develop alternative control strategies that address the daytime biting of the adults in addition to the focus on applying larvicides upstream of the rapids where the larvae develop.

Initially YIF is using a small boat equipped with a sprayer to apply larvicide e.g. temephos, across the river, but it is important to develop ways of protecting agricultural workers from the nuisance and the disease transmission that the adult flies bring during the day.

A survey of the health of the villagers was carried out prior to insecticide applications by Dr Same-Ekobo and his team from the Faculty of Medicine, University of Yaounde. The mean

WHO has recently published Specifications for Equipment, which can be seen at www.who.int in the publications list. In relation to IRS, the Compression sprayer with the pump separate from the tank lid is the type required. Originally Hudson Manufacturing Company supplied the X-Perit sprayer that met the specification. More recently equipment supplied by Guarany (Brazil) Micron (UK) and Semco (Japan) has met the specification. The new specification advises the use of a control flow valve so the output remains the same as pressure falls inside the tank. There should also be a lock-off on the trigger valve to reduce accidental release of spray liquid when the operator is not directing spray to the wall surfaces. Where countries have opted to use DDT again there must also be a strict audit of its use to avoid any DDT being applied to crops.

number of people examined was 71.3 per village with 9.2% of these being children under five years of age. 20.6% of those examined tested positive to malarial parasites, but this increased to 27% for the young children. Approximately half of the villagers had filariasis (*Onchocerca volvulus*), with various levels of poor eyesight and some were blind. 11% of the population were suffering from epilepsy, which seems to be associated either with onchocerciasis or its treatment. Work continues to establish the exact cause for this unusually high incidence. As information is gained from the trial it is hoped that the results can be used to expand operations in neighbouring villages and assist in the National Programme for malaria control. Hopefully a reduction in disease vectors will result in benefits to agricultural production and help pull the communities out of poverty.

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