Blackfly control: what choices after onchocerciasis?


Blackflies are reappearing in areas of West Africa where they used to be controlled with insecticides because they were vectors of the parasite Onchocerca volvulus. Even though they no longer transmit onchocerciasis in these areas they can hinder optimal land use through their biting behaviour. The authors discuss the problems associated with resuming the use of insecticides to control the blackfly and recommend that ground treatment be restricted to areas where it is likely to be effective on a continuing basis. In communities lacking technical and financial resources the only alternative consists of individual protection through the use of repellents or protective clothing.

Above a certain level of aggressiveness, biting insects are a major inconvenience to people and may hinder socioeconomic development. This is particularly true in the intertropical zone, where aggressive behaviour by biting insects usually continues throughout the year. Most of the countries in this zone lack the resources needed for effective, long-term, environmentally friendly insecticidal campaigns.

Blackfly control has been practised in West Africa since 1975 at the regional level, as part of the Onchocerciasis Control Programme, whose objective is to eliminate onchocerciasis as a public health problem and an impediment to socioeconomic development. The transmission of Onchocerca can be interrupted by destroying the blackfly vector, Simulium damnosum in its larval stage. Development of the insect from egg to nymph rarely takes longer than a week, and spraying is therefore carried out at weekly intervals. Treatments are predominantly applied from the air because of the large number of breeding sites and the difficulty of reaching most of them overland. Vector control remains the preferred approach to onchocerciasis control in regions long subject to reinfection by blackflies from untreated areas and in areas where the disease is hyperendemic.

Aerial spraying has, however, ceased in the regions where the risk of contracting onchocerciasis has declined almost to zero, as indicated on the map. Between now and 2002, when the activities of the Programme are expected to end, 25 million hectares of fertile agricultural, agro-industrial or stock-raising valleys will
Vector control in West Africa: the current situation

Control of the blackfly nuisance

In the early 1990s, shortly after vector control had ceased, the blackfly bite rate again reached high levels in some areas that had been cleared of onchocerciasis infection. The Programme encouraged individual action against the blackflies, not only because of the nuisance they represented but also to reassure the public, who associated these insects with transmission of the disease. Low-cost control techniques on the ground for dealing with breeding sites were standardized (I) and “on the job” training was given to technicians in mobile health teams, nurses in health centres, community health workers,
agricultural supervisors and personnel attached to socioeconomic development projects. Blackfly control operations on the ground have now been transferred to development units, among them the oil palm plantations on the Boubo and the Sourkoudougou ranch in Côte d’Ivoire, and the rice-growing plains upstream of the Sélingué dam on the Sankarani and the irrigated perimeter of Baguinéda on the River Niger in Mali.

The intensification of such operations, however, raises questions that should be considered before the Programme ends. A successful transfer of activities can only take place if the users are entirely familiar with the technique they have been taught and if they are aware of its limitations. The Programme should speedily advise the participating countries of the dangers inherent in uncontrolled larvicide application on the ground. How long the applications will persist is unknown, and problems may eventually arise in connection with the toxicity, mode of action and cost of the insecticides.

In the Onchocerciasis Control Programme, blackfly control is based on seven insecticides used in rotation (2). This strategy, intended to avoid the problem of resistance, requires precautions that protect non-target aquatic fauna (3). Real-time knowledge of the discharge rates of treated rivers is necessary, as is a relatively high degree of specialization among users. Larvicide application performed by non-specialists for an indeterminate period would carry an enormous risk of environmental pollution.

Two of the insecticides, however, present no environmental hazards: *Bacillus thuringiensis* H-14 is a product of biological origin, and temephos is an organophosphorus compound. Temephos, the chemical with which the Programme began its vector control work in 1975, unfortunately gave rise to physiological resistance in blackflies, and this would probably have spread if other insecticides had not been introduced in its place. The use of temephos therefore cannot be encouraged for long-term treatment on the ground. On the other hand, the sensitivity of blackflies to *Bacillus thuringiensis* H-14 has not diminished at all after 14 years of intensive use. For this reason the Programme has supported certain blackfly control initiatives by making this product available without charge. This cannot continue indefinitely because of the growing demand for insecticides and the impending cessation of the Programme’s work. After 2002, unless public or private capital is forthcoming, village communities wishing to engage in agricultural or agropastoral activities will have to suspend blackfly control. There is a risk that these communities will use the insecticides that are available locally, in particular agricultural pesticides, with the attendant danger of causing resistance and contaminating the environment.

**Self-protection**

The above remarks suggest that, with certain exceptions, the control of blackflies is not necessarily the best way of ensuring the long-term development of areas freed from onchocerciasis. An alternative solution is for individuals to use repellents
or wear protective clothing. Numerous products intended mainly to protect against mosquitos, usually based on pyrethroids, are on the market. Their effectiveness against blackflies remains to be proved, and in any case their price is too high for most of the communities concerned. The Programme is therefore preparing an inventory of locally used repellents with a view to selecting those that perform best, ascertaining the traditional recipes for their manufacture, and promoting their wide availability.

The use of specially designed clothing hardly seems feasible. The hot humid conditions of the areas in question are not favourable for clothes which cover the body almost completely. Moreover, the acquisition of protective clothing, even the purchase of a long-sleeved shirt, is likely to represent a major financial outlay in most of the communities concerned. When insects are biting in large numbers the usual response is to make the best possible use of ordinary clothing.

**A rational strategy**

The blackfly nuisance can be expected to intensify as the Programme draws to a close and more sites of socioeconomic interest are identified. It is essential to encourage a realistic attitude to the problem, and this requires three categories of site to be distinguished:

- sites where blackflies do not impair development and where no control is desirable;
- sites with the potential for providing substantial income and where advantage is likely to be gained from long-lasting treatments on the ground together with additional measures such as the training of personnel;
- traditional agricultural sites where the use of insecticides is not recommended because resources are inadequate and users are untrained.

In most cases the nuisance caused by blackflies does not justify control. Before the Programme ends, a public awareness campaign should be concentrated on those village communities in whose vicinity increasing numbers of blackflies can be expected. It should explain the non-infective nature of the insects in areas where onchocerciasis has been eliminated as well as the possibilities for control and self-protection.

**References**

