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SEMINAR ON THE ROLE OF HEALTH SERVICES AND TRAINING INSTITUTES IN THE CONTROL OF VECTORS AND RESERVOIRS OF DISEASES

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ROLE OF PRIVATE SECTOR (COMPANIES) IN CONTROL OF VECTORS AND RESERVOIR(S) OF DISEASE

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The private sector within this specific sense is comprised of two important branches. Firstly, in many countries there exist the private pest control operators. However, their role in controlling disease vectors, particularly in the developing countries, is limited in view of the fact that vector control has to be carried out at the community level and not individual family level. Secondly, the cost involved may be beyond the resources of the inhabitants. In the agricultural sector perhaps such services may have a role to play especially when aerial application of pesticides has to be carried out. Even here the activities have to be carried out according to the existing rules and regulations of the Government In some countries the private pest control operators work particularly for household pests such as cockroaches, bed-bugs etc. Here again, the scale of applications is rather limited and may not be too significant from the point of view of disease control.

The greatest role of the private sector in vector control of course is their collaboration in the provision of new insecticides and formulations to replace those against which the vectors have already developed physiological resistance They have always collaborated in the WHO Programme for Evaluation and Testing of New Insecticides which was established in 1960 and renamed the WHO Pesticides Evaluation Scheme (WHOPES) in 1982.

The old scheme as described by Wright (1971) included seven stages of evaluation and a great number of compounds were submitted by the pesticide manufacturing companies. Between 1961 and 1981 roughly 2 000 compounds were tested and this included screening of chemicals against houseflies, mosquitos etc. and ended with large-scale epidemiological trials to assess the effect on the transmission of malaria. Trials on other vector species were also included later. The recent trend has been for a contraction of the programme due to a sharp decline in the number of new compounds submitted to the scheme, increasing costs of conducting large-scale trials and growing changes in the strategies of vector and disease control.

Wright, J. (1971) The WHO programme for evaluation and testing of new insecticides. Bull. Wld. Hlth. Org., 44, 11-22.

A recent meeting of the Directors of Collaborating Centres on the Evaluation and Testing of New Insecticides, held in Geneva in March 1982, concluded that pesticides will continue to be needed for the control of vectors and new compounds will be required to replace those whose use has been discontinued due to the development of physiological resistance, environmental problems or toxicological reasons. Therefore it will be increasingly important over the next few years to cover a greater variety of pests and pesticides. The Laboratory Directors felt that this extension of the scheme could be achieved by combining the original aim of developing chemicals for the control of major diseases such as malaria with the collaborative efforts of WHO, WHO Collaborating Centres, member states and the private sector (industry). The revised scheme renamed WHO Pesticides Evaluation Scheme (WHOPES) is set out as below.

The success of the scheme will depend on pesticide manufacturers for an increase in the number of new compounds entered into the scheme It is also expected that the industry will collaborate with WHO in Phase 3 testing and trials. With the formal working relations of WHO now established with GIFAP, the scheme is expected to be further publicized. It is also hoped to produce a Newsletter describing the progress of candidate pesticides during their evaluation and the focussing of industries' attention on the need for new compounds and their potential market, at a later date.

The WHOPES Scheme

Chemicals will pass through four phases, as described below and shown as a table in the Annex. All compounds entering the scheme will already have been tested by the manufacturer for pesticidal action, and some information will be available on their physical, toxicological and environmental properties. This information will be passed by the manufacturer to WHO and the Collaborating Centres and will be of great value in taking decisions about the potential use of the compound for control and of the testing programme required. Details are available from WHO/VBC, Pesticides Development and Safety Unit.

Phase 1 will be operated by Collaborating Centres. They will receive samples of the active ingredient and formulations and evaluate the potential of the chemical as appropriate against adults of important vectors, larvae of mosquitos, Simulium and other vectors or against molluscs or rodents. Susceptible and where available, resistant strains will be tested. Compounds which meet the criteria will pass to phase 2 on the basis of the results but further phase 1 laboratory tests will normally run parallel with the second phase and include measurements of possible impacts on non-target organisms and the possibility of resistance developing to the compound under test.

Phase 2 will take the form of small-scale field trials conducted by Collaborating Centres in appropriate ecological areas, using formulated materials. In some instances such as in mosquito control, phase 2 may be the first occasion when there is extensive contact between man and the chemical in the field and observations of any undue effects due to exposure will be made. Also in this phase, some effects on non-target organisms may be measured in the field, and observations will be made on the physical properties and suitability of formulations.

Phase 3 will include both village and larger scale field trials; It is expected that it will normally be organized and carried out by three collaborating groups: WHO, member states and industry. The active participant in a member state could be a national vector control programme or a Collaborating Centre. Experience indicates that the best results are likely to be obtained if WHO initiates the partnership and participates by supplying experts to cooperate in planning, implementation, and evaluation of the trials. The main measurements will still be those of efficacy against the vector, but observations on safety, or a safety survey, will be made. Data on the physical properties of the formulation will be obtained as a guide to specifications to be drawn up for successful pesticides. Control of disease is the ultimate purpose of vector control and epidemiological measurements are obviously desirable. The extent to which they can be included will depend on the size of the trial. Smaller trials will only allow an estimate of epidemiological effects to be made from measurements of the vector response, but large trials can support a full epidemiological survey.

Meeting the criteria of phase 3 is the end-point of the evaluation process, but further campaigns with a useful pesticide are only likely to be effective if the large quantities required can be purchased with confidence in their quality. For this purpose, the following phase is now included in the Scheme.

Phase 4 will be concerned with the development of specifications for the active ingredient and for appropriate formulation for the types of application found to be effective. It requires information on physical and chemical properties, and collaborative studies of analytical methods. It will be conducted by Collaborating Centres and WHO in consultation with the manufacturer.

Passage of chemicals between Phases

One of the main differences between WHOPES and the former Scheme is that compounds may be tested against several vectors by various methods of application requiring different types of formulations. Decisions on passages between phases will therefore depend on compound, vector and use, and will employ the test methods and criteria. Unfavourable toxicological observations can stop the progress of a compound at any time. The passage from phase 3 to phase 4 will be based on entomological and toxicological data as well as on available epidemiological information.

Sources of chemicals for testing

New compounds continue to be produced in small numbers. They have usually been developed for agricultural pests, but industry is likely to be interested in an extension of the market if they are shown to be successful against vectors of public health importance.

Effectiveness against agricultural pests is a primary consideration in the commercial development of a chemical; however, cases are known where the intensive use of insecticides in agriculture (especially on cotton) has resulted in or has accelerated the selection of insecticide resistance in mosquitos. Compounds that appear to be selectively effective against vectors should be identified and their commercial development encouraged.

Some compounds submitted to the former scheme may need re-evaluation on a compound/vector/use basis. Some of these were eliminated during the test evaluation but are now worth reconsidering. They may have been rejected for lack of efficacy against the test species then used, or for such reasons as inadequate residual action or high mammalian or non-target toxicity which could now be modified by changes in formulation. Information which would help in identifying such compounds, and which should be available in the data bank, includes insecticidal activity, the ratio of insect to mammalian toxicity and a lack of cross-resistance to compounds now in use. Another important requirement is an interest on the part of the manufacturer which is sufficient to ensure availability if the chemical is successful and moves through the revised scheme.

It is suggested that Collaborating Centres should use any contacts they have with industry to encourage the submission of compounds to the scheme.

THE WHO PESTICIDE EVALUATION SCHEME (WHOPES)

1.	Laboratory tests	Active ingredient and formulations	Pesticidal efficacy persistence; effects on non-target organisms	Spectrum of resistance; selection	Toxicological review and/or test	Collaborating Centres
2.	Small-scale field trials	Formulations	Efficacy; effects on non-target organisms	Recording of physical properties	Safety observations	Collaborating Centres
3	Village-scale and larger field trials	Formulations	Efficacy; effects on non-target organisms; epidemiology estimate or survey	Recording and testing of physical properties	Safety observations or survey	Member states and/or Collaborating Centres Manufacturer WHO
4	Specification	Active ingredient and formulations	Collaborative studies on analysis and physical properties			Manufacturers Collaborating Centres WHO

NOTES

1. Source of compounds
   (i) notification and supply of basic data - Manufacturer; Collaborating Centre
   (ii) supply of test material - Manufacturer
   (iii) recording of data - WHO

2. Compounds will pass through the scheme as compound/vector/use and therefore may be in more than one phase simultaneously.