VECTOR BIOLOGY & CONTROL

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# INSECTICIDE RESISTANCE CONFERENCE

## REPORT ON A MEETING TO PLAN FOR WORKSHOPS ON INSECTICIDE RESISTANCE OF VECTORS IN THE AMERICAS

by

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# EXECUTIVE SUMMARY

This meeting was held at the Hotel Fiesta, November 13, 1987, in Guatemala City. Dr. Francisco Lopez-Antuñano (PAHO/Washington), Dr. George Shidrawi (VBC/WHO/Geneva), Dr. David Bown and Mr. Ricardo Rios (PAHO/Guatemala), Dr. Mauricio Sauerbrey (VBC/USAID/El Salvador), and Dr. Andrew Arata (VBC/USAID/Washington) were in attendance.

The origin of the meeting stems from the Vector Biology & Control Division of WHO/Geneva desire to improve its Global Programme on Insecticide Resistance, and to coordinate the results obtained worldwide from the use of the test kits produced by WHO in Geneva. Dr. Slooff, Director of VBC/WHO/Geneva, indicated at the first VBC/USAID TAG meeting, held in July 1986, that he would like to strengthen this Programme. He felt that the American Region of WHO (AMRO/PAHO) would be a good starting point. In fact, VBC/WHO was allocated some funds by S&T/H in the annual grant for the purpose of computerizing existing data and for planning workshops to stimulate the collection of additional data.

VBC/USAID agreed that this could be a collaborative effort between VBC/WHO and PAHO. VBC/USAID agreed to participate in an initial planning meeting, and to consider funding a share of a follow-up collaborative effort with PAHO and WHO. Accordingly, this collaborative effort was included as a prospective activity in the Third Annual Work Plan of VBC (1987-88) (Activity LP-025-3).

This meeting, which was arranged through PAHO, VBC/WHO, and VBC/USAID, represented the first step in developing this collaborative activity.

# I. NOTES ON THE MEETING

## A. Introduction

Dr. Shidrawi reviewed the WHO Global Programme which was started in 1957 when insecticide resistance was first recognized as a major threat to control eradication programs. He emphasized the need for global standardization, the importance of the WHO test kits based on impregnated filter papers (adult bioassays), and standard dilutions of insecticides (aquatic larvae). Individual tests, using locally prepared materials, or bioassays conducted as part of the control programs (e.g., on walls of sprayed houses) were recognized as suitable for individual projects, but not for global monitoring.

The smallest number of tests (in terms of the number of species tested and the number of individual tests reported) received by VBC/WHO/Geneva came from the American Region. Frequently these come from areas where PAHO has its entomological staff and not from national entomologists. In contrast, Pakistan alone reports over 1,000 tests per year (see Section B. Discussion).

The VBC division of WHO would like to strengthen their Global Monitoring by:

1. Developing workshops on the methodology of testing (using WHO test kits), analysis, and reporting the results to VBC/WHO/Geneva for further analysis, and global monitoring and reporting.

2. Establishing one or more entomologists in each country to carry out the country appropriate tests on a wide range of vectors, and to analyze these test results.

3. Recommending the formation of national committees (health, agriculture, etc.) to review national pesticide use.

4. Strengthening the network to assure that WHO test kits are used worldwide and that all results are reported to VBC/WHO/Geneva for evaluation analysis, global monitoring and reporting.

## B. Discussion

Many tests are being carried out in the Americas, but these tests may not be reported to WHO/Geneva. Most results are

available to PAHO through national reports, regional journals, annual reports of malaria and Aedes control programs, and project reports. Dr. Lopez-Antuñano referred to a 100-page working document presented at the WHO/Geneva Expert Committee on Resistance (1985) entitled, "Extension and Operational Importance of the Resistance of Vectors to Pesticides in the Region of the Americas". Dr. Lopez-Antuñano suggested that PAHO could and would conduct additional literature resistance testing surveys being carried out in American countries. The information obtained from the surveys would be reported to VBC/WHO/Geneva so that their records from this Region could be updated.

However, two basic problems appear to exist in the overall WHO program in relation to the American Region:

1. A lack of communication between the Region (AMRO) and VBC/WHO/Geneva;

2. many tests being conducted in the Region are not uniformly based on the WHO test kits (although the methodology is essentially the same) and therefore do not fit the criteria required by VBC/WHO/Geneva for their Global Programme.

In addition to these two basic problems, three specific problems were cited as problems in the WHO program:

1. Ordering test kits is expensive and (for some countries) cumbersome. To order the kits, a request must be sent through the PAHO country representative, who then sends the request to PAHO/Washington, then to Geneva, and back.

2. Testing requires more than a kit, as expenses for local travel, salary and per diem for workers, vehicles, etc., are not always available.

3. The insecticide impregnated filter papers are sometimes out of date when received (at least organophosphate and carbamate compounds), or the compounds to be tested are not readily available in the test kit format. The former was the case in a shipment received by VBC/USAID.

The PAHO participants also pointed out that there are trained persons throughout the Americas who know how to do resistance trials -- training has been, and is, carried out in Venezuela, Panama, Guatemala, U.S.A. (the "Wedge", University of S. Carolina) by PAHO, often with USAID assistance, and through short courses and refresher training courses in the various

countries. Countries needing further strengthening of their programs can be assisted when provided with equipment (kits) and funds (travel and per diem).

The PAHO participants emphasized that resistance testing should be carried out to respond to local needs, and not only to monitor regional or global patterns. I agree with this sentiment. Although knowledge of broad patterns of resistance is important in understanding trends and even anticipating future problems based on experience from other geographic areas, most testing is required on a local basis to understand whether use of a given pesticide is appropriate in an ongoing or planned control program.

Furthermore, many field studies have demonstrated that behavioral characteristics of mosquito (vector) populations may be as important as toxicity and efficacy of a compound in any given situation. Therefore, resistance trials using test kits alone are inadequate for planning and evaluating control programs.

Global resistance monitoring has important implications for the pesticide manufacturers and the global market for a given pesticide. It was suggested that WHO/Geneva consider seeking subsidies from the pesticide manufacturers to underwrite the costs of producing the test kits, as well as training and testing, since the Global Programme provides what can be considered a service to the industry.

Following discussion of some of the points mentioned above, the participants agreed that more complete and systematic testing of the susceptibility/resistance status of vectors on a sub-regional basis was very desirable.

The sub-regions of the Americas are identified by PAHO as:

a. Mexico-Central America and Panama
b. The Caribbean
c. Andean (Colombia, Bolivia, Ecuador, Peru, Venezuela)
d. Brazil, the Guayanas and Surinam
e. Southern Cone (Argentina, Chili, Paraguay, Uruguay)

The areas identified as being of most interest to USAID are Central America and Panama and the Andean countries. VBC/USAID may be able to participate in activities in these regions (and the Caribbean), but the others do not include A.I.D. priority countries.

Accordingly, it was agreed that a worksnop be organized at PAHO facilities in Guatemala to develop a network and train two

or three persons from each of the countries (Mexico, Guatemala, Belize, Honduras, El Salvador, Nicaragua, Costa Rica and Panama) representing both agriculture and public health. The best time of the year would be in July during the rainy season in Guatemala.

Several points were raised:

1. Dr. Shidrawi felt three weeks would be required for the workshop. Dr. Lopez-Antuñano felt two weeks would be adequate and that it would be hard for participants and PAHO staff to spend three weeks at a workshop. Dr. Arata agreed. Subsequently two weeks (to be determined) in July were agreed upon.

2. Dr. Shidrawi favored using all test kits during the workshop (hence, three weeks including collecting of test subjects). Drs. Lopez-Antuñano and Arata would prefer concentration on mosquitoes (Anopheles and Aedes) and some time on triatomines, but flies, roaches, lice and ticks, should not be equally emphasized.

3. Training during the workshop will also include analysis of vector behavior (e.g., indoor-outdoor biting habits, repellency of various insecticides, house construction, etc.).

4. It will also be desirable to have demonstrations (perhaps by CDC staff at their research laboratory in Guatemala) of biochemical methods for testing for insecticide resistance.

5. Participants from the various countries will be expected to prepare and present a review of insecticide testing in their countries and, if possible, a review of currently used agricultural pesticides, by crops and quantities.

6. Therefore, the PURPOSE of the workshop will be to generate knowledge about usage of pesticides, linkage with agriculture, for improving the future direction of disease control programs.

7. A very important consideration is how the workshop will stimulate coordination and sharing of information in the future. PAHO is in the best position to do this as it has several entomologists and technical officers in the sub-region, and under the A.I.D.-funded Central

America and Panama malaria project has ongoing research and training programs.

At the same time, it is expected that the workshop will generate sub-regional data, and serve as a model for future upgrading of the WHO Global Resistance Programme of VBC/WHO/Geneva.

## II. SPONSORING

PAHO will host the workshop in Guatemala, provide local transportation, and make all local arrangements for collecting sites and laboratory facilities. Dr. Bown and Mr. Rios (PAHO) will be in charge locally. Dr. Bown will be a course coordinator. Dr. Nelson (PAHO/Panama) will also participate.

PAHO will arrange for the participants from Nicaragua, and Mexico (if VBC/USAID is not able to do so). The PAHO entomologists based in Central America and Panama travel to all the countries in the course of their duties and will follow up on the participants and coordinate testing and reporting in the future.

VBC/WHO/Geneva will provide the services of Dr. Shidrawi as a course coordinator. VBC/WHO/Geneva will also provide the WHO testing kits for the course and materials for future testing. The quantity WHO can provide will be decided when Dr. Shidrawi returns to Geneva and this information is communicated to PAHO and VBC/USAID.

All test results subsequently sent to VBC/WHO/Geneva will be promptly analyzed and returned to the respective countries, PAHO and USAID along with information from other regions.

VBC/USAID will provide[1] travel and per diem for two or three participants from each country eligible for A.I.D. support, but not to exceed a cost of $25,000. VBC/A.I.D. will contact the various Missions to request that they fund participants from their respective countries.

VBC/USAID will be represented by Dr. Arata and/or other VBC staff according to schedules. Dr. Sauerbrey will be available for at least part of the workshop.

Dr. Arata spoke with Mr. John Massey (HNP, USAID/ Guatemala) and was assured that the Mission would approve holding the workshop in Guatemala if no Mission funds were required.

VBC estimate of cost:

1. Participant per diem $40/day (suggested by PAHO)

2. Travel - estimated as $250/participant

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[1]Subject to approval by the VBC Project and USAID/Washington when this proposal is submitted.

3. Three participants from Guatemala to receive $20/day per diem and no travel.

4. Three participants each from:

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| Mexico | El Salvador |
| Belize | Costa Rica |
| Honduras | Panama |
| Nicaragua (to be covered by PAHO) | |

| Summary of Options: | | A | B |
|---|---|---|---|
| A. 3 week (21 day) course (21 participants) | = | $20,630 | |
| B. 2 week (14 day) course* | = | | $15,170 |
| VBC staff and/or consultant travel and per diem | = | 5,000 | 5,000 |
| | | $25,630 | $20,170 |

*The 2 week course was favored at the time this report was prepared.