identify areas that require additional research effort in order to increase the effectiveness of pest management.

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Paper No. 4

FUNDING FOR INTEGRATED PEST MANAGEMENT IN MOSQUITO CONTROL

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ABSTRACT. Funds for mosquito IPM research, pilot programs or implementation are very scarce and lagging far behind support for IPM in crop production. The relevance of IPM to mosquito control is being accepted and conceptual endorsement of funding by several agencies is occurring. It appears that funding of mosquito IPM will have to come largely from traditional sources including operational support.

The question of funding for mosquito control integrated pest management (IPM) has 2 aspects. One is allocation of existing resources; the second is identification of new money specifically designated for IPM.

To allocate existing resources, mosquito control decision makers have long considered the principles now embodied in the overall concept called IPM. The 3 basic control technologies, namely physical, biological, and chemical, all historically have been used in combination, with funding priorities being assigned de-

pending upon specific local needs. Currently, however, changing political and fiscal climates are making it more necessary than ever before to analyze costs and benefits in deciding where program emphasis is to be placed, and in deciding how the several prevention and control methods can be used to complement, rather than to interfere with, one another. Of major concern in California is Proposition 13; similar spending limits threaten budgets of mosquito control agencies across the nation. Labor-intensive systems, as mosquito control currently is, are especially vulnerable.

As a result, mosquito control people would be wise to consider the reasons that so much emphasis is given to the concept of "threshold" in IPM. Each mosquito control agency must invest in surveillance systems adequate to provide data on population densities, and must also understand what the data mean relative to disease transmission, injury, and annoyance. Knowing how many mosquitoes can be permitted to exist, and how to most economically maintain populations at or below that level, will allow always-limited resources to be allocated wisely. IPM has been described as an acronym for "intelligent" pest management, a most apt term for what is really involved.

New money specified for mosquito IPM research, pilot demonstrations, or operational implementation is unfortunately nearly non-existent. A telephone survey of numerous contacts across the nation revealed that there is money going to support projects in agricultural and forestry IPM but very little identified for mosquito IPM, except for normal operational expenditures.

In California, for instance, mosquito prevention and control research is funded through the University of California budget supplemented from federal sources. Research addresses surveillance, disease transmission and nuisance thresholds, physical control, biological control, and chemical control; no one project attempts to pull all of the elements together. On the other hand, agriculture in California is moving strongly into not only IPM research but operational implementation. Funds are provided mainly through the state's general fund (principally sales and income taxes) with some federal money coming via the U.S. Department of Agriculture and the U.S. Environmental Protection Agency.

At the federal level, there is likewise money directed toward IPM, money directed toward mosquito control (research only), but nearly none in mosquito IPM specifically. IPM is recognized in some unlikely places, such as Public Law 95–524. This amendment to the Comprehensive Employment and Training Act funnels some youth and young adult jobs into environmental quality control including IPM activities. Representatives of several federal agencies were asked what they foresee relative to IPM. Their responses were much abbreviated for this report.

The President's Council on Environmental Quality has a report coming out during mid-1979, which will speak to encouraging IPM (in general) research either through new money or by redirection. The Center for Disease Control is not doing anything specific in mosquito IPM. The Department of Defense encourages the military to consider all available vector control techniques on military installations, although there is no overall hard policy. There are plans to centralize control over research policy at the office of the Deputy Director of Research for Defense, which may increase research with an IPM thrust, including mosquito IPM. Both the National Institutes of Health and the National Science Foundation support single-approach research projects, but nothing identified as mosquito IPM. The U.S. Environmental Protection Agency is considering a comprehensive rice pest management project which would include mosquito IPM, but is limited in its ability to fund projects for which it is not specifically charged under law. Many of the agency representatives

commented on the difficulty of obtaining funds for these kinds of projects; fiscal conservatism is the current rule.

The U.S. Department of Agriculture has long been involved in single-approach research and extension which are now being plugged into IPM. The FY 80 budget contains a total of $6.5 million for IPM research and pilot studies. At the time of this writing, the fate of the budget has not yet been decided. Research on insects affecting man and animals would be included. None of the money would be designated for operational implementation. The U.S. Agency for International Development hopes to move into mosquito IPM (which it prefers to call "comprehensive vector control") in a relatively big way. If all goes well, it will request something near $1 million for FY 81 but the likelihood of obtaining such as amount is uncertain. Currently, the Agency would entertain requests for small projects costing no more than $35,000.

In summary, it appears that funding for mosquito IPM will have to come largely from traditional sources, including operational support. The requests of several agencies for line-item IPM funding indicate conceptual endorsement of IPM; only time will tell whether the necessary money will be provided.

Paper No. 5

PESTICIDE REGULATION, PEST MANAGEMENT AND MOSQUITO CONTROL

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ABSTRACT. The policies of the United States Environmental Protection Agency (EPA) on pesticide registration and marketing are discussed with emphasis on recent changes. The impact of these policies on integrated pest management (IPM) and the conceptualization of IPM in EPA are discussed. EPA is attempting to encourage the development of the technology needed in IPM.

I'd like to spend most of my time discussing EPA's policies concerning integrated pest management, and some of the ways EPA can be involved in encouraging mosquito control technology. But first, I'd like to outline some of the recent changes in the pesticides law which may have an influence on mosquito abatement practices.

EPA has a very direct impact on pest management through the premarket pesticide regulatory program or pesticide registration—all pesticides must be cleared through EPA before going into sale and use. The Agency is not infrequently viewed as the "bad guy" when approval of products that are viewed as "essential" to effective pest management and maintaining high levels of crop production or protecting the public health is not immediately forthcoming. EPA has had significant legal, resource and administrative problems during the last few years in implementing the pesticide law, but I believe that the recent amendments to the Federal Insecticide, Fungicide, and Rodenticide Act, or the FIFRA, should bring relief in many serious problem