

IR-4, ARS, the Deployed War-fighter Protection Research Program: Partners in the Search for Public Health Pesticides — by Karl Malamud-Roam, IR-4 Public Health Pesticide Manager

The IR-4 Project has recently joined the U.S. military and the USDA in an effort to develop new pesticides for protecting public health. This is the latest in a series of public and private actions which highlight both the critical need for an adequate supply of public health pesticides (PHP's), and the need for public support to ensure the availability of these products.

Public Health Pests and Public Health Pesticides

People have long been threatened by a wide range of public health pests, which can make them sick, either by vectoring pathogens, causing allergic reactions and secondary infections following bites, or simply through their nuisance value. Mosquitoes, ticks, sand flies, bed bugs, and their kin collectively sicken and kill millions of people annually and cause untold discomfort and lost productivity around the globe. Unfortunately, there are very few safe, effective, and affordable products available to combat these threats to human health and comfort.

Over the last few decades, the PHP market has encountered similar challenges facing other minor-use pesticide markets — essentially, increased regulatory requirements, insufficient financial incentive for private industry to invest heavily in research and development for the smaller markets, and ever-present concerns about liability and litigation. While ensuring pesticide safety and public confidence is essential, high regulatory costs can stifle innovation or drive products from the market even when there is little or no evidence that they pose significant risks.

For PHP's, resistance is a problem in many areas. In addition, vector-borne disease cases have been relatively rare in the developed world for a number of years, and many members of the public in these countries are increasingly risk adverse regarding chemicals in general and pesticides in particular. These factors have contributed to low public investment in PHP's in recent years.

Both the Federal Insecticide, Fungicide, and Rodenticide Act and the Food Quality Protection Act (FQPA) recognized that PHP's deserve special regulatory attention because of the key role they can play in disease prevention, but public dollars to match these statements of Congressional intent and public commitment have been scarce. In particular, the FQPA authorized federal spending of up to \$12.5 million/year for data collection in support of regulatory requirements for PHP's, but



these funds have not yet been appropriated.

The Search for New PHP's

The last decade has seen a renewed interest in PHP's and their availability, largely because of the continuing high morbidity and mortality associated with malaria. A renewed commitment to combating malaria and the insects that transmit it has been reflected in the global Millennium Development Goals, the President's Malaria Initiative, the formation of numerous aid and advocacy groups, and the funding priorities of the Gates Foundation and other philanthropists. While most of these efforts have focused on distribution of insecticide-treated nets and other interventions, important PHP research and development has also occurred, much of it sponsored by the IVCC (Innovative Vector Control Consortium) in Liverpool, or the National Institutes of Health, and some of it addresses diseases beyond malaria.

An additional major motivation for PHP's innovation in recent years has been the deployment of U.S. and allied military personnel in combat areas where they have been exposed to a wide range of relatively unfamiliar vector-borne diseases. A particular problem has been cutaneous leishmaniasis, transmitted primarily by the sand fly *Phlebotomus papatasi*, which has sickened thousands of deployed warriors. Additionally, many common mosquito adulticides have not worked adequately in some environments (especially hot deserts). Finally, humanitarian missions by the military, such as providing assistance after the 2009 earthquakes in Haiti, have pointed out limitations in the existing PHP products.

In response to this need for new PHP's, the military's Armed Forces Pest Management Board (AFPMB) and the USDA Agricultural Research Service (ARS) rekindled the PHP development partnership that years ago brought DEET, the aerosol pesticide can, ultra low volume (ULV) application technology, and many other innovations to market. Started in 2004, the Deployed War-Fighter Protection Research Program (DWFP) has been a highly productive research consortium, funding both ARS and outside researchers, and generating copious papers, patents, and incipient products for development (see www.afpmb.org/dwfpresearch.htm). By 2008, the DWFP research and product discovery pipeline was flowing fast, and the DWFP began moving into its next phase – product development and registration.

IR-4 and the PHP Program


Once a new pesticide compound or product has been discovered and its efficacy demonstrated, the next steps in converting a concept into a usable product are the same for PHP's and other pest control products. Prompt pesticide registration is always important, but for military-use PHP's it is critical for two reasons – satisfying this legal requirement is necessary for military use in state-side facilities, and for developing the market required by commercial partners. EPA registration also serves as an independent review of human and environmental safety, which reassures the troops and foreign governments when these products are used overseas.

Registration support for new pest control technologies for small markets has been the mission of the IR-4 Project since it was



created, so it was a clear choice when DWFP needed a new partner to help bring underutilized or novel PHP's through registration to the field. In 2008, agreements between DWFP, ARS, and IR-4 led to the formation of the IR-4 Public Health Pesticide Program. As with small market agriculture, IR-4 provides advice and regulatory assistance and conducts research as budgets allow.

Additionally, the IR-4 PHP Program collaborates with EPA and user groups on improved integration of chemical products into Integrated Vector Management (IVM) strategies, support for the regulatory needs of existing PHP's, development of standardized data dossiers and other methods to streamline the PHP regulatory



process, research, and outreach. The IR-4 PHP Program works to identify and register PHP's for use globally, through collaboration with IVCC and other global partners. Finally, The IR-4 PHP Program maintains the only public access database specifically dedicated to public health pesticides. Available through ir4.rutgers.edu/publichealth/publichealthDB.cfm, the PHP Database provides information on the efficacy of chemical products against specific public health pests, PHP use patterns, and regulatory status inside and outside the U.S.

While there may always be the threats of disease vectors and vector-borne diseases, AFPMB, USDA-ARS, and IR-4 are at the forefront of the effort to ensure the availability of PHP's to combat these threats.