

U. S. Department of Agriculture -U. S. Department of Defense Strategic Plan for Research on Military Application of Integrated Pest Management Fiscal Years 2004-2008

Overview

This document describes the pest management research targets of most concern to the Department of Defense (DoD) that can be performed by the research agencies within the U.S. Department of Agriculture (USDA), principally the Agricultural Research Service (ARS), but also the Animal Plant Health Inspection Service (APHIS) and the Forest Service. The opinions expressed have been staffed through the individual committees of the Armed Forces Pest Management Board (AFPMB) and approved by the Executive Council of the AFPMB.

Use of this Document

This document satisfies the charter of the standing Research Committee of the AFPMB to “Draft an annual report outlining DoD’s research needs on a budget year basis...” This strategic plan is intended to list objectives for research as conceived by members of standing committees of the AFPMB. The objectives are organized into three categories: IPM for the Direct Benefit of Deployed Forces; Development of New Pesticides and Application Techniques to Prevent Insect-Borne Diseases in Deployed Forces; and IPM to Preserve the Training Base and Navigable Waterways. The objectives are not prioritized, but their presence in the document implies that completion of any of them would be of great benefit to the military. Some of the objectives are related to funding provided by DoD to USDA and others are not funded by the military at this time. It is the intention of the Research Committee that future annual Research Reviews will be organized according to the objectives. Memoranda of Understanding (MOUs) subordinate to the Master MOU should be written to address objectives funded by the military. These MOUs should include the direction to produce a business plan for research leading to completion of the objective.

Background

The USDA and DoD have a history of productive cooperation in the area of integrated pest management dating back to World War II, when USDA developed compounds to protect military personnel from mosquitoes that transmit malaria and chiggers that transmit scrub typhus. At least two agreements justify continuing cooperative research interactions between the DoD and the USDA: The Master Memorandum of Understanding (MMOU) on Research of Mutual Interest to the DoD and the USDA; and the Memorandum of Understanding (MOU) on Biological and Toxicological Testing of Pesticides between the DoD and USDA. In this cooperative partnership, the USDA plays a critical role in the research and development of tools designed to fulfill DoD’s unique requirements for protection of military personnel, materiel, and real property.

Integrated Pest Management requires three essential components: Surveillance, control, and monitoring. Effective vector control cannot be conducted efficiently and safely unless all three components are in place. Surveillance defines the problem, allowing the proper methods of control to be chosen and preventing waste of resources. Control usually consists of the application of several methods simultaneously, reducing the vectorial potential at several points

in the insect's life. Monitoring the results of control efforts can direct the methods to greater effectiveness, as well as documenting the value of the vector control program.

The military applies many different aspects of preventive medicine to limit the negative impact of infectious diseases on operations. Preventive medicine measures like sanitary food handling and solid waste management are applied in the same manner in most situations by trained technicians. Entomological interventions, on the other hand, are generally designed for the specific situation by professional entomologists. During an actual military operation, these entomological interventions can dominate preventive medicine activity because arthropod-borne diseases account for many of the infectious disease problems encountered overseas. As a result, operational commanders demand vector control on operational bases and for personnel who perform military missions outside of a cantonment. This constant demand for vector control is one of the primary motivations for continual research to improve the effectiveness and safety of entomology in the military. Recent experiences in Africa, Southwest Asia, and Korea have shown that vector control can still be an important component of disease prevention, even when effective antibiotics or vaccines exist.

The application of entomological interventions by the military is very different from application by civilian authorities. First, personnel and other resources are in chronically short supply during a military operation. Effective vector control therefore requires very careful selection of targets through accurate surveillance. Surveillance is complicated, however, by the possibility of encountering insects that carry disease unfamiliar to the entomologist and by lack of access to the site. Second, control measures are applied to unique working conditions (e.g., bunkers, tents, soldiers on military patrol) under circumstances where personal and environmental safety is paramount. Finally, the failure of the vector control effort would have an immediate effect on combat readiness, so that results are highly visible at all levels of the organization. The military also has unique stewardship responsibilities to prevent transport of invasive species on military vehicle and equipment, whether into the US, out of the US, or between third party countries.

Research Objectives

IPM for the Direct Benefit of Deployed Forces

1. Develop new or improved systems for surveying insects that carry disease under austere, remote, and combat conditions.
2. Understand the physiology of repellency and attraction to develop new compounds with greater specific activity and/or higher user acceptability (supported by an Interagency Agreement between Walter Reed Army Institute of Research, US Army Medical Research and Materiel Command, and the Chemicals Affecting Insect Behavior Laboratory, Agricultural Research Service, US Department of Agriculture).
3. Examine existing area repellents for efficacy and develop new spatially effective repellent systems useful in military situations.
4. Develop new methods or formulations for treating cloth (including waterproof materials) to prevent vector biting.

5. Expand the number of active ingredients and formulations available for safe, insecticidal application to contiguous indoor surfaces.

Development of New Pesticides and Application Techniques to Prevent Insect-Borne Diseases in Deployed Forces

1. Develop new public health pesticides and/or develop new formulations for EPA-registered active ingredients.
2. Develop new, or improve pesticide application technologies for increasing efficacy of pesticide dispersal and/or reducing the amount of active ingredient needed for effective control.
3. Support the registration/re-registration of military-unique uses of EPA-registered public health pesticides.

IPM to Preserve the Training Base and Navigable Waterways

1. Develop procedures to prevent bird strikes around military airfields.
2. Improve Integrated Pest Management of weeds, vertebrate pests, and insects that negatively affect training ranges, military facilities, and navigable waterways.
3. Prioritize potentially invasive species; create systems to prioritize, detect, and destroy invasive species carried on military equipment and supplies, including movement out of the US and between third party countries.