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Integrated Mosquito Management: No New Thing

To the Editor: Rose displays a fundamental misunderstanding of the history of mosquito control when he states, "Mosquito control in the United States has evolved from reliance on insecticide applications for control of adult mosquitoes (adulticide) to integrated pest management programs that include surveillance, source reduction, larvicides, and biological control, as well as public relations and education" (1).

More than 100 years ago, General William C. Gorgas used a multifaceted approach to control mosquitoes when he and his staff brought yellow fever under control in Havana after the Spanish-American War. He was to repeat this approach in Panama, where the French had lost 20,000 lives to mosquito-borne disease in their failed attempt to construct an isthmusian canal.

In New Jersey at the turn of the century, state entomologist John B. Smith was convinced that the state could be made mosquito free. The laws of 1902 provided for funding to study mosquitoes and resulted in Smith's comprehensive study of the subject (2). Smith's work led to water management as a primary means of controlling mosquitoes on New Jersey's extensive salt marshes. He addressed the issue of biological control by native fish, primarily saltmarsh killifish. Thus, Rose's claim is inaccurate: Integrated mosquito management (IMM) was alive and well at the turn of the century.

When the New Jersey Mosquito Extermination Association was formed in 1913, state mosquito control workers began what has been a long involvement with education and public relations. These critical components of IMM have long been an essential part of mosquito control activities throughout the United States. Reports by various county control agencies in New Jersey reveal an ongoing concern with water management. Indeed, these early reports speak of water management, particularly in the upland environment, as a means of making lands formerly considered useless productive and thus generators of tax revenues.

Regarding surveillance, the laws of 1905 charged the director of the New Jersey Agricultural Experiment Station with conducting surveys of mosquito breeding in the various political entities of the states. The standard tool for surveillance, the New Jersey light trap, was developed in the 1930s and has been in regular use since then. Thus, another key component of IMM was in place at the turn of the last century.

IMM has long been the standard operating procedure in New Jersey and many other states. In the early 20th century, mosquito fighters did not have the array of weapons now available. They had to use the tools available to them: sanitation, habitat management, larvicides, fumigation for adults, screens for exclusion, education, and legal action (i.e., fines for maintaining mosquito-breeding sites on private property).

The association between mosquitoes and disease was very real in the early days of mosquito control. As recently as 1880, 20,000 lives were lost to malaria in the Mississippi River Valley, and malaria was endemic in the Tennessee Valley. Mosquito control in the Tennessee Valley Authority area was not brought about by mosquitocides but by clear-cutting the margins of bodies of water to reduce or eliminate mosquito habitat. The wide-scale use of mosquitocides did not occur until after World War II. Before then, IMM was the only response they had. To ignore these facts does a grave disservice to those who fought in the mosquito wars in the early part of the 20th century.

I also disagree with Rose's discussion of some biological control agents. One has only to look at the number of mosquitoes coming off a flooded high tidal marsh to realize that biological control is useful primarily in areas where mosquito populations do not result in thousands of mosquitoes per trap night. Similarly, some of the limitations listed for various mosquitocides are givens. Mosquito control workers know full well there is no panacea; that is the reason for IMM. It is erroneous, for instance, to list subsurface larvae as a limitation for monomolecular films; where a monomolecular film is present, subsurface larvae cannot emerge because the reduced surface tension does not allow the newly emerged adult to stand on the water's surface. An insect landing on treated water passes through the surface and drowns. Indeed, the greatest drawback of monomolecular films is their effect on insects that require a certain amount of surface tension, such as water striders.

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Integrated Mosquito Management—Reply to Dr. Rupp

To the Editor: My article (1) was not intended to delve into the history of mosquito control nor cast aspersions on the great work that was done to fight malaria and yellow fever a century ago. Rather, the article is a short review of contemporary integrated methods of mosquito management and a discussion of how public health pesticides may be affected by the Food Quality Protection Act's amendments to the Federal Insecticide, Fungicide, and Rodenticide Act.

Mr. Rupp contends that the article misinterprets the history of mosquito control and does a disservice to those who fought in the mosquito wars in the early 20th century. Mr. Rupp valiantly defends this early history in his letter,