

MEMO

To: Board of Directors

From: Joseph M. Conlon, Technical Advisor, American Mosquito Control Association

Date: October 31, 2006

RE: Board Summary – Mosquito Misting Systems

Background:

At the 02 Oct 2006 BOD meeting the KICA Board placed a suspension on the current use of mosquito misting systems.

The forerunner of the modern residential MMS was first patented and placed into service in 1972. Originally, these systems were designed for the control of flying insects in barns and stables. With the emergence and spread of West Nile Virus, concerned citizens began seeking solutions to mosquito problems in their own backyards, particularly where an organized mosquito control option was not available. Over time, MMS have undergone a number of changes. Product selection, pesticides used (synergized pyrethrum, permethrin, “exempt” pesticides); system design (spray components, reservoir enhancements, mixing improvements, location/placement, etc.) and added controls (light sensors, motion detectors, wind gauges, etc.) have evolved over time in response to both consumer wishes and safety/efficacy concerns. Currently, there are more than 12,000 systems, including those installed in barns, in use.

I was asked to give a presentation at quite informative meeting in Washington, DC entitled “Mosquito Misting Systems Stakeholders Forum” in December of 2005. As the name implies, the meeting was designed to allow federal and state regulators, mosquito misting system manufacturers and other interested parties an opportunity to begin a dialogue on the resolution of several important concerns expressed by AMCA and the State FIFRA Issues Research and Evaluation Group (SFIREG) in formal documents forwarded to EPA in 2005. The conference was sponsored by the National Pest Management Association (NPMA), American Association of Pest Control Officials (AAPCO), Association of Structural Pest Control Regulatory Officials (ASPCRO) and the U.S. Environmental Protection Agency and was attended by over 100 interested parties from throughout the country.

The program was designed to address a variety of perspectives and consisted of three separate panels:

1. Industry Overview of MMS
 - a. Manufacturers of Mosquito Misting Systems (MMS)
 - b. Manufacturers of Conventional Pesticides used in MMS
 - c. Manufacturers of Exempt Pesticides Used in MMS
 - d. Pest Management Professionals Who Install and Service MMS
2. USEPA Update on Agency Regulatory Initiatives Regarding MMS
 - a. Overview of EPA Role
 - b. Registration Status and History of Pyrethrins
 - c. Reregistration of Pyrethrins, PBO and Pyrethroids

3. Regulatory Issues

- a. Human and Non-target Species Exposure
- b. Licensing and Certification
- c. Advertising, Right –to-Know and Chemical Sensitivity
- d. Do MMS Contribute to Resistance?

The program was quite comprehensive and its aims ambitious. I represented the AMCA on the Regulatory Issues panel and presented concerns we have about MMS promoting resistance. I discussed both resistance mechanisms and documented resistance in mosquitoes to pyrethrum formulations akin to those used in MMS. I concluded that these systems do indeed promote resistance for a number of reasons upon which I elaborated. I deliberately refrained from tying them directly to resistance development, particularly where their relative paucity would prevent them from exerting significant selection pressure. I did, however, emphasize the need for surveillance results driving interventions - and how this is inimical to current MMS operation. In addition, I spoke at length about resistance management strategies and how these systems could compromise the implementation of these strategies where co-located with organized mosquito abatement organizations. The delegates agreed that my concerns were altogether reasonable, but some were surprised to learn of documented resistance in mosquitoes to natural pyrethrins in California.

It was interesting to note that the panel members representing industry were fully cognizant of the many challenges confronting them regarding these systems. Two of the panel members went into substantial detail about regulatory and professional concerns attendant to their use.

Challenges that they identified included:

1. IPM – do these systems lessen incentive for IPM measures?
2. Effects on beneficial insects
3. Resistance – do they contribute to resistance?
4. Do they work?
5. System Damage – leakage, ruptured lines/drums
6. Homeowner Intervention – access to timers/remotes, changing formulations, human/animal exposures
7. Licensing and certification
8. Liability and insurance problems
9. Soliciting customer involvement in IPM
10. Specialized training needs for installers and service personnel
11. Proper advertisement – overselling, false claims of safety/efficacy, use around pools and ponds
12. On demand versus timed application

These concerns mirrored those of the regulatory participants and formed the basis of much discussion regarding how best they might be resolved. Additional items of concern were expressed by the EPA and state regulatory panel members. EPA elaborated upon labeling problems and listed a number of variables that affect risk assessment scenarios including size of insecticide reservoirs, spray release height, number and duration of spray events, applications rates and nozzle coverage area. State regulators (NY and FL) expressed concerns regarding licensing (commercial vs. homeowner), certification (jurisdiction over system regulation) and labeling language (“must” vs. “should”).

The breadth of the issues prevented in-depth discussion of any one problem. Thus, it appears that a great deal of work needs to be done if any consensus is to be achieved. An ad hoc committee comprised of panel members is reviewing the problems raised in the presentations in order to prioritize them for further action. Ultimately, an action plan with recommendations and milestones will be developed and promulgated. Of major concern is the relative lack of reliable data demonstrating that these systems work as advertised. In particular, the CDC representatives, Roger Nasci and George Luber, both expressed concern that the number and type of studies on these systems to date did not adequately characterize problems associated with their use. All parties agreed that a number of research avenues should be explored regarding human exposure dynamics, volumetric concentrations of insecticide, and evaluation of application rates for efficacy.

I have had significant misgivings about MMS as acceptable mosquito control practice. Indeed, I had previously expressed these concerns in a letter that I had drafted and sent to the EPA on behalf of the AMCA. In addition, I'm all too aware of the perception of MMS by my fellow mosquito control professionals. Nevertheless, I came away from this meeting with increased respect for pest management personnel and the expertise they bring to their profession. My distinct impression, shared by the panelists from EPA, the state regulatory agencies and CDC, is that the manufacturers and distributors of these systems want to provide effective and acceptable mosquito control to their customers within an integrated management context. They are also anxious to pursue and possibly fund studies that address the system shortfalls identified during the forum. Most importantly, they are keen to cooperate at all levels with mosquito control in order to provide services that complement, not compromise, our efforts.

I'm certainly not prepared to endorse mosquito misting systems as currently configured. Nonetheless, they are probably here to stay in some form and EPA is not likely to prohibit their use. With that in mind, it would fall to the membership of the AMCA, as the recognized experts in mosquito control, to participate productively in the ongoing dialogue to the extent that we can reasonably ensure that our high standards are met. To be sure, those with valid concerns about mosquito-borne disease living in areas devoid of an organized control entity will seek means to protect their families. In many cases they consider the use of repellents, habitat elimination and other recommendations we make to be inadequate for their needs. At present, misting systems may seem their only viable option – and they'll purchase them whether we like it or not. Short of recommending their use, I believe the AMCA should do its best to ensure that they be designed and employed so as to provide the maximum level of acceptable control. EPA, state regulatory agencies and CDC are inclined to agree.

Updates:

Since that time there has been much information generated, both pro and con on these systems. The issue is still under review by numerous regulatory agencies at the State and Federal levels so new information is emerging on a regular basis.

Some of the major developments:

- 1) Exposure to adults is **not** a human health concern based on “2 spray events [per day] each lasting a period of 1 minute.”
- 2) Exposure to toddlers **is** of a human health concern based on “2 spray events [per day] each lasting a period of 1 minute.”
- 3) While the product is toxic to fish and shellfish, if applied correctly at labeled concentrations, it is not likely to have an impact. However, a 100-foot setback would be prudent to avoid potential Clean Water Act issues.

- 4) The most consistent concern voiced by State and Federal agencies is the potential for pesticide resistance development in the mosquito population. Although resistance is unlikely in the case of pyrethrum usage, it has been demonstrated in California.

Issues that remain unanswered:

- 1) Does the method of mosquito misting system operation have the potential to create resistance to pyrethrins in mosquito populations on Kiawah Island? These systems do promote resistance (as do all pesticide applications). It's unlikely, however, that they will actually cause resistance in this instance because:
 - a. Relatively few systems are in operation
 - b. Influx of unexposed migrating mosquitoes is significant
 - c. Pyrethrum resistance is P450-mediated, unlike resistance mechanisms (*kdr* gene) normally associated with the synthetic pyrethroids commonly used in wide area mosquito abatement.
- 2) If resistance occurs, are there other products that can be used in mosquito misting systems? If resistance developed the systems would become useless, for the only alternative product labeled for use in these systems is permethrin. Permethrin is commonly used as a wide area adulticide. If used concomitantly in misting and wide area programs, resistance would develop rapidly due to increased exposure load. Resistance to permethrin would carry over to all the synthetic pyrethroids in short order, making them all ineffective. This would then force districts to utilize organophosphates in adulticiding programs. These chemicals are far more toxic and may have significant public acceptability issues. They are also not registered for use in misting systems. Furthermore, this would place wide area mosquito control in the hands of only one class of pesticides, making resistance management strategies involving rotating classes of pesticides impossible. This, in turn, would promote resistance to the organophosphates. Once this occurred, there would be no alternatives left and wide area mosquito control would not be possible.
- 3) Do these systems actually lower mosquito biting pressures? There is currently no peer-reviewed evidence to support the claim that these systems actually affect mosquito biting in the treated area. To date, only testimonials are available and they are notoriously unreliable. An ad hoc committee of stakeholders at the Washington forum was charged with developing research protocols to ascertain their effectiveness. Research personnel at the Public Health Entomology Research and Education Center at Florida A&M are currently
- 4) What is the effect on non-target insect, reptile, and avian populations subjected to "applications that penetrate areas of thick foliage representing harborage areas in a backyard?" If the method of control is to reach the mosquitoes where they rest in vegetation rather than while they are in flight, this has the potential to affect any species that uses vegetation as a nighttime resting or roosting place. Entomologists are commenting on this issue but wildlife ecologists and/or naturalists should also have an opportunity to provide input as well.
- 5) Will beneficial, non-target insects at the juvenile stage be negatively impacted? Butterfly and moth caterpillars and other immatures that actively forage will be negatively impacted.
- 6) What impact will mosquito misting systems have on the overall ecology of the Island?
- 7) Exposure can produce allergic reactions in some adults. How are these Members and those on the Chemical Sensitivity List accommodated?
- 8) What rights do Members have to prevent a misting system from being installed near them? A constructive dialogue among KICA stakeholders and outside agencies has borne fruit. Installation and maintenance companies are no longer claiming that the products they use are "all natural" and non-toxic. Some misting system companies have expressed a willingness to require

wind and rain sensors on installations here at Kiawah. This is critical to significantly reduce offsite drift in windy conditions and runoff of unneeded chemical during rains. Some companies have also shown a willingness to eliminate the use of “manually activated” remote control devices. Although remote controllers allow users to apply chemical as needed – in much the same way as purchase of foggers allow – they also allow for misuse of product in the wrong hands. It would be prudent to eliminate them entirely.

Information being provided by various mosquito misting companies regarding their practices is conflicting. Application rates employed by some companies that are purportedly lower, less toxic and act as a “repellant” are not necessarily representative of application rates used by other companies. And there are still claims that are questionable. Marketing these systems as a control for diseases such as West Nile Virus and Eastern Equine Encephalitis on Kiawah is misleading. A consortium of experts from the various stakeholder groups involved in the original forum in Washington has developed a set of Best Management Practice guidelines that will be promulgated in the future. This will address advertising claims, certification issues, and other problematic concerns.

The installation/maintenance companies’ responsibilities are to their individual customers, to perform an installation that is in accordance with the label and the law and to operate that system in the same manner. Problems arise because there is no coordination of effort. Companies claim to perform Integrated Pest Management (IPM), but there has not been, as yet, any contact either among themselves or other mosquito control agencies (the Lakes Department) with regard to what surveillance or control methodologies are in place. Indeed, there have been no requests by any companies for surveillance data on record. There is 15 years of data that could be utilized by the misting system manufacturers and installers to more accurately predict fluctuations in mosquito populations and eliminate misting applications when a need is not indicated. Neither have requests for information regarding how often mosquito adulticide control operations are carried out by KICA. Some areas of the Island are sprayed nearly every week during the mosquito season. Concomitant misting would unnecessarily increase pesticide load during these redundant applications. This would point to a significant potential for over application. This is not technically illegal but is not a good mosquito control practice. Pesticide application is not a trivial matter and, without coordination of efforts, could result in unforeseen and unwanted consequences.

Lakes Department stands to derive no benefit from limiting the use of these types of systems. To the contrary, the Lakes Department activities would only be eased by their use, logistically and operationally. I bring this to the Board’s attention because, to date, there has been no comprehensive evaluation of misting systems and their impact to determine what affect they will have on Kiawah and its Members.

Critical Issues:

Liability in the case of adverse environmental impacts due to runoff, spills and drift; human health issues due to drift.

Action Being Sought:

Timed release of chemical sprays in the absence of survey data to establish their need is no longer acceptable mosquito control practice. Their use is utilized by anti-pesticide activists to challenge the concept of chemical control. This not only drives chemophobic sentiment with regard to misting system use, but redounds beyond that to all chemical mosquito control

methodologies. This has the potential of having profound affect on pesticide regulation in the latest round of registration review scheduled to occur in the latter part of this decade. Imprudent use of mosquito control pesticides may drive increased pressure from environmental groups to more stringently regulate those few adulticides we now have. For this reason, I cannot recommend their continued use, even if consumer demand provides a ready market. Nonetheless, I can easily see the reason consumers seek this method of control and I firmly believe that the majority of vector control companies offering this service are informed pest control professionals keenly aware of their shortcomings as a mosquito control tool. Yet, I foresee their main function as that of an adjunct to local nonprofit governmental mosquito control agencies.

If their use is not suspended, I suggest the following regulatory actions be implemented.

- 1) All systems must be registered with the Community Association.
- 2) All systems should have rain and wind sensors installed and fully functional.
- 3) No remote control devices should be permitted. This will prevent applications at times that are not appropriate and prevent overuse of the system chemicals.
- 4) Only contractors licensed and certified through Clemson Department of Pesticide Regulation should have the ability to service the units and add product.
- 5) Nozzles should be located no closer than 100' from waterbodies, wetlands, and marshes.
- 6) Nozzles should be located no closer than 50' from public areas such as leisure trails and parks.
- 7) Application times should be set to reduce impact on non-target species. Systems should run at dawn and dusk and for no longer than 1 minute per application.
- 8) Nozzles should not be located higher than 10' in trees.
- 9) Misting systems can only be used for the control of mosquitoes, not other species such as spiders or caterpillars that may be "perceived" pests. Other pesticide applications that target these species should be employed.
- 10) The Community Association should be notified of changes of pesticide used in the misting system.
- 11) The Community Association should be notified of any chemical leaks that occur in a misting system.
- 12) The Lakes Management Department should make the decision when in the year the system are started and when they are shut down for the season. This would be based on the mosquito counts the Department currently conducts.

Cost:

Administrative time maintaining a database of misting systems and field time documenting system locations and inspecting systems.

Timing:

Board discretion.

Approvals Necessary/Received:

- Mr. Norm Shea notified Town of Kiawah Island Environmental Committee of existence of systems on the Island and my concerns regarding them at the 13 June 06 meeting.
- Mr. Norm Shea notified LLMAC of existence of systems on the Island and my concerns

Changes/Revisions:

N/A