December 20, 2006

Mr. Joe Bunting
General Manager
Kiawah Island Community Association
23 Beachwalker Drive
Kiawah Island, SC 29455

VIA E-MAIL

RE: Kiawah Island Mosquito Misting

Dear Mr. Bunting:

I am a board certified urban entomologist with over 30 years experience in managing pest problems in and around urban dwellings. My background in mosquito control goes back to the early 1970's when I worked as a mosquito researcher and as an entomologist for a mosquito abatement district. I became aware of the Kiawah Island Community Association's issues with mosquito misting and thought I would add my comments to the discussion.

I have reviewed the Kiawah Island Community Association web site and reviewed the documents posted regarding mosquito misting. Specifically I have reviewed two articles by Mr. Norm Shea, one published in 2005 entitled "Insights into Mosquito Control" and the other Kiawah Island Digest article published in September of this year. I also reviewed the rebuttal comments to Mr. Shea's September 2006 article by entomologist Bert Snyder dated October 4, 2006. Based on this review I have the following comments and observations.

1. First, I agree completely with Mr. Snyder's October 4, 2006 rebuttal to portions of Mr. Shea's September 2006 digest article. I believe Mr. Snyder has done an excellent job pointing out many of the inaccuracies in Mr. Shea's article. I believe that I can add to this discussion only by reaffirming some of the statements already made by Mr. Snyder and in offering a few of my own.

2. In Mr. Shea's September 2006 Digest article, he alleges that pyrethrin "is now synthetically produced". This is wrong. Mr. Shea is confusing natural pyrethrin, extracted from chrysanthemum-like flowers, with a class of insecticides known as pyrethroids. The synthetic pyrethroids are in fact man-made compounds that, at least originally, were based on two of the esters found in natural pyrethrin. The two insecticide classes could not be more different. For example, natural pyrethrin has essentially no residual activity. While many of the synthetic pyrethroids are chlorinated and can last for months or even years

under the right conditions. Further, natural pyrethrin deteriorates rapidly in sunlight. In fact, 50% of any pyrethrin applied outdoors in sunlight degrades into harmless substances within 10 to12 minutes. On the other hand, synthetic pyrethroids applied to windowsills in direct sunlight can continue to kill houseflies landing on the sill for up to twelve months. Since natural pyrethrin is the product being used in mosquito misting systems, it is important not to confuse it with the much newer and more persistent synthetic pyrethroids.

3. Mr. Shea's comments about pyrethrin killing beneficial insects such as honeybees, dragonflies, and butterflies have been appropriately addressed by Mr. Snyder. However, I would also like to point out that none of these insects is active at night and as such would not be exposed to the pyrethrin mist when properly applied at night. In addition, the dose of pyrethrin utilized in modern misting equipment is specifically calibrated for mosquitoes. Honeybees, dragonflies, and butterflies are each at least ten times larger in mass than mosquitoes and as such would be much less susceptible to the dose of pyrethrin used for mosquito control. I should point out that it is also well established that pyrethrin does in fact act as a repellent to honeybees as well as other insects.

4. Quoting from Mr. Shea's 2005 article entitled "Insights into Mosquito Control" he states "As previously mentioned there are limits to the results truck-mounted fogging can achieve. The area covered by this type of operation is 150 feet on each side of the truck". And yet, Mr. Shea admonishes in his September 2006 article "Consequently, pyrethrin should not be applied in a way that can carry it into water bodies or the marsh". Is he implying that the product he uses when fogging does not require this same caution? The technology used in residential misting equipment and that of truck-mounted foggers or ULV devices is different. Truck-mounted foggers produce very small, highly concentrated, oily droplets of insecticide and as Mr. Shea points out have a drift radius of at least 150 feet. Modern mosquito misting units generate droplets 2 to 3 times the size of the truck-mounted foggers and are primarily water with a very low concentration of insecticide. Misting equipment droplets, due to their size, do not drift very far at all before they settle out. I would suggest that bodies of water are far more at risk from contamination by truck-mounted foggers than they are by homeowner misting systems.

5. Mr. Shea also implies in his September 2006 article that the inclusion of the synergist piperonyl butoxide increases the toxicity of pyrethrin. This is false. The inclusion of synergists in pyrethrin formulations serves to block detoxification enzymes in the insects body. Thereby enabling the pyrethrin to kill insects at lower doses. The inclusion of a synergist does not affect the toxicity of the pyrethrin per se. Additionally research has demonstrated that the inclusion of synergists with pyrethrin does not increase the toxicity of pyrethrin in mammals. Further, pyrethrin does not concentrate in animal food chains or the environment.

6. There are several additional facts about the insecticide pyrethrin that are important to consider. First, the United States Environmental Protection Agency has established an acceptable daily intake of pyrethrin in humans of 0.04 milligrams per kilogram of body weight. Second, natural pyrethrin is one of if not the most, common insecticide in over the

counter home and garden insecticides. In fact, it is routinely sold in a shampoo formulation for the control of head lice. Products such as RID Head Louse Shampoo have a concentration of pyrethrin approximately 10 times that used in mosquito misting systems.

7. In his September 2006 article Mr. Shea suggests alternatives to misting for mosquitoes. Unfortunately, most of the alternatives he suggests are targeted at controlling the larval stage of the mosquito in the water. I think it's safe to say that most homeowners could care less about mosquito larvae since they do not bite or interfere with human activities in any way. It is the adult mosquito that most homeowners are concerned with since they bite, can transmit disease and interfere with outdoor activities. Mr. Shea states in his 2005 article "Insights into Mosquito Control "the arrival of West Nile virus to South Carolina makes mosquitoes more than just a nuisance and people are understandably concerned". It should be clear that larval mosquitoes neither transmit West Nile virus nor any other human pathogen. It is the adult stage of the mosquito that is troublesome and it is the adult stage that misting systems target. Properly installed and operated misting systems can assist the homeowner in reducing the number of biting adult mosquitoes around their property which clearly makes the outdoors more enjoyable and also may aid in reducing the incidence of mosquito borne disease.

In summary, while Mr. Shea's September 2006 article offers a compelling perspective it unfortunately rests on a biological infrastructure that, to be kind, is impoverished.

With these observations, I have focused primarily on the insecticide pyrethrin because I believe the product is in fact the real issue here. Misting systems are nothing more than mechanical application devices and represent no benefit or harm to humans or the environment. However, misting systems when coupled with a properly used insecticide, such as natural pyrethrin, are an ideal tool for homeowners to use in reducing local nuisance adult mosquitoes that large-scale mosquito abatement programs do not control.

Should you have any questions concerning these comments place to not hesitate to let me know.

Yours truly,

Jeffrey B. Tucker, B.C.E.

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