

INTEGRATED TICK MANAGEMENT



Webinar Question & Answer Session August 30, 2018

What percentage of ticks are infected? If we do not know, what are some strategies that would help increase our knowledge? Surveillance? Eliciting citizens in surveillance? Funding? What types of jobs/training would help?

(Dr. Williams) Typically, 25% of nymphs and 40-50% of adults are infected with *Borrelia burgdorferi*.

Will human vaccine for Lyme infection ever come back?

(Dr. Williams) Hopefully. There is a movement to get it back, but to re-register it is going to cost millions of dollars.

Is Met52 still available? Some suppliers are suggesting it has been discontinued by Novozyme.

(Dr. Williams) Yes. We ordered and applied some this summer. I can get you the info if you email me at scott.williams@ct.gov.

How do the sprays (acaricides) work? Do they have to land on the ticks directly, or do they act passively/residual?

(Dr. Williams) Both, but mainly passively. Different compounds have different durations of effectiveness after application.

Are fipronil bait boxes available directly to consumers? If yes, do you know where?

(Dr. Stafford) The bait boxes are only available through certain licensed applicators. They are not a homeowner use product.

Are deer dead-end hosts for *Borrelia*? Or do they become viremic to infect naive ticks?

(Dr. Stafford) Deer are incompetent hosts for *Borrelia burgdorferi*.

For interventions that have used bait boxes, how many do you have to have in a location in order to have a broad enough reach to see a reduction in ticks?

- (Dr. Williams)** Here in Connecticut, we have had some success with it, but we use anywhere from eight to 12 per property. Some of these properties range two to four acres. There have been a few papers, by [Schulze and Dolan](#). Schulze did it in New Jersey on quarter-acre properties and used eight bait boxes, and they found no ticks parasitizing mice thereafter. So, eight bait boxes per quarter-acre of property, or half-acre of property. It was small. Dolan did one here in Connecticut in Mystic, where he had, I believe, 10 bait boxes on larger two-acre properties, but all the properties were adjoining and each used 10 bait boxes. They had success, too, where no ticks were parasitizing mice thereafter. We [CAES] put anywhere from an average of eight to 12 boxes out, but on individual properties without that connectivity. We were successful in reducing ticks, but not entirely. We had some ticks parasitizing mice thereafter.
- (Dr. Stafford)** In the original study that was done on Mystic Island in Connecticut, all of the residences were treated with the bait boxes. So, essentially, on that island, the tick population was pretty much wiped out because of the coverage that was done. So, the bait boxes would obviously have a more significant impact if not just you as an individual resident, but also your neighbors were using it as well.

Would you please describe what we are looking at in the photo with the cow that looks like it is covered in mud? It was on two of the slides.

- (Dr. Stafford)** That picture was a cow going into a dipping station. That was for control of cattle fever ticks down in Texas. For that particular livestock pest, there are only three methods for controlling it. That tick is found in Mexico, and there is a quarantine zone along the Mexico-Texas border. This tick also feeds on deer, but cattle that are infested have to be dipped, treated with an ivermectin compound, or undergo pasture rotation in order to control the tick.

Why are tick tubes with permethrin-treated cotton available to homeowners, but tick bait boxes with fipronil wicks are not?

- (Dr. Stafford)** That was originally, in part, a marketing decision made by the company when they first developed the bait boxes. There was also some concern originally with handling the boxes and being exposed to the mouse droppings that might be in the box, and things that like, which actually turned out to be not that relevant in this particular case. But, it's the way the EPA licensed it.

What are some lessons learned in communicating with the public and/or partnering with public agencies (e.g., health departments) to increase resident/community participation and engagement in tick management approaches?

- (Dr. Stafford)** That is a tough one. As Dr. Williams pointed out, depending on the kind of engagement or intervention that is being undertaken, it can raise some issues, like we found with the deer issue with the hunters. Again, it is largely still an individual homeowner decision and approach, so [the work of] these public agencies and communicating with the public has largely been educational. But, engagement in actual tick management approaches has been, at least at the public level, relatively limited as far as I am aware.

Are there any concerns with increasing rodent activity in a residential community if tick bait boxes are used?

- (Dr. Williams)** The bait in the bait box does not have any nutritional value, so it is just used as an attractant and it will not increase populations if used.
- (Dr. Stafford)** Bear in mind, the reason you have to use as many bait boxes at a residential property – about every 30-60 feet – you need to remember that for these rodents, for most of them, they have a limited home range. Maybe a half-acre at the most for an individual rodent. A few will disperse, but for the majority of them, we are talking a half-acre or less for the home range.
- (Dr. Williams)** But, because the bait box is not nutritional, you are not going to increase populations by using them.

Has anyone thought about the effects of other animals consuming the treated mice, like hawks, fox, or snakes?

- (Dr. Stafford)** That issue was addressed in the original studies that were done. The concentration in the fipronil bait boxes is only 0.7%. What you put on your dog as a top-spot fipronil is 10%. In order for a predator to get a meaningful dose, they would have to consume *a lot* of mice.

In the last study described, could the lower infection rates on mice in residential settings be due to higher densities of deer in those settings because there is more edge habitat and less hunting there?

- (Dr. Williams)** That is a very good question. Deer were one of the species that had the same abundances in both residential and woodland settings, meaning that they popped up on the cameras in equal abundance. Generally, the answer to that question is that in residential settings, you are seeing more reservoir incompetent hosts, just generally, and that is why we were seeing a lower infection in the mice.
- (Dr. Stafford)** Related to that is the fact that even though deer are dilution hosts - any larvae or nymphs that are feeding on the deer will not become infected with *Borrelia burgdorferi* - it is more than compensated for, in many cases, by the sheer number of ticks that are generated by female ticks that are feeding on those animals. So, you have a balancing act there between the dilution effect, which is usually more than countered by the population of ticks is derived by those feeding on the deer.

Are you planning to research the connection between tick management techniques and the impact on human burden of tick-borne diseases?

- (Dr. Stafford)** The issue with looking at the connection between tick management techniques and the actual impact on the human burden of tick-borne diseases is difficult. Often, in these studies there are not resources to handle both the intervention and the human element. In terms of actual disease, you get into some real issues on detection and reporting, so it does get a little complicated. I alluded to two studies where that was actually done, where an impact was shown on human diseases. One was the deer reduction study, and one was the deer treatment with 4-posters study. But, again, very few studies have been able to follow through on that, usually because of insufficient resources.

Similarly wondering if your studies show whether there is a minimum threshold for the density of bait boxes in a neighborhood, when presumably, some neighbors may purchase boxes and some will not. Someone may choose to protect their property, but if their neighbor does not, there may be a reduction in the level of protection. How do you manage the "checkerboard effect"?

- (Dr. Williams)** That is tough because as private landowners, you can do what you like on your land and we cannot dictate to them what to do. Really, we are just documenting that effect, and that is a limitation in their use.

Has there been any control studies done on *H. longicornis* with natural oil products in any of the areas or countries they currently inhabit?

- (Dr. Stafford)** We have not seen any yet. *[An additional webinar from NEVBD featuring Dr. Alan Heath of New Zealand is targeted for fall 2018. Dr. Heath has experience researching the longhorned tick and aspects of control].*

Given the limitations you have outlined, do you think community-based tick control programs (such as those for mosquitoes) are feasible?

- (Dr. Stafford)** I think they are very challenging and possibly a lot more expensive than perhaps mosquito control programs. If you think about it, most mosquito control programs operate on a wider scale and they are not targeting individual properties. Remember, mosquitoes fly, ticks do not. The issue is being able to address the risk and presence in individual properties, which does not lend itself to an approach quite the same as mosquito control programs. Where you put mosquito dunks in a catch basin, for example, you do not have to have direct home access to the backyards. So it is more challenging and more difficult to do.