SHELTER ISLAND AND FIRE ISLAND DEER AND TICK CONTROL STUDY

Monthly Update
June - July 2009

Dan Gilrein
Extension Entomologist
Cornell Cooperative Extension of Suffolk County

Susan Walker
Extension Associate-Wildlife Specialist
Cornell University, Department of Natural Resources

Note that our semi-annual report covering project activities to May 2009 has been posted to the Shelter Island Town website (http://www.shelterislandtown.us/Gallery/Forms/133.pdf).

4-Posters and Ticks

All 4-Posters have been deployed for over three months on Shelter Island (60 devices) and Fire Island (six devices) and continue to be functioning well. A few devices, including one for the first time on Fire Island, have needed minor repairs due to squirrel chewing damage. Our 'low-tech' and inexpensive rubber collar retrofit to address overstretched post springs is still holding up very well and the new springs also continue to work well. Corn consumption continues to steadily increase, similar to what we observed last year at this time.

Tick sampling began on June 11 and ended on July 6. Despite the rain, we were able to finish the work in a time frame similar to last year. A summary of last year's tick numbers can be found in the semi-annual report referenced above; data from this year has not been entered or compiled yet. As a reminder, if the devices are working as intended we should see a greater impact on tick populations in the counts *next* year (June, 2010). During non-project woodland sampling in northern Southampton town in late May, adult and nymph-stage lone star ticks (Figure 1) were found in abundance and are still common as of early July. Larvae (often mistaken for chiggers) were first seen in North Haven sweeps in early July. Blacklegged (also called deer) tick nymphs (Figure 2) have been common, but adults were scarce by mid-June. Some larvae were found in Shelter Island samples in late June. As a reminder, lone star ticks can be a carrier of the pathogens causing erlichiosis and Southern tick-associated rash illness (STARI), while blacklegged (deer) ticks can carry the pathogens causing Lyme disease, anaplasmosis and babesiosis. A 'demonstration' was conducted at the Southampton site with an organic product as a landscape broadcast spray, comparing tick levels in treated and untreated areas. About one week after spraying lone star adult and nymphs, and blacklegged tick nymph levels were consistently lower in the treated area, although ticks were still present in both. The material caused phytotoxicity (foliar 'burn') to broadleaf plants that were included in the application; we had also seen this in a similar trial last year. The trial was not replicated and therefore no confident conclusions can be reached on level of control, but it reminds us of the need to evaluate performance against each tick species and stage at different times of year and after various periods following application. Comparisons with other acaricides would also be enlightening, although this work is outside the scope of the 4-Poster study itself.

I met with Dr Mat Pound, one of the inventors of the 4-Poster device, on June 26 to discuss the project and issues. For example, Mat thought the rubber collar and spring modifications were good ones, although he noted that some rollers had a slightly shorter nap than recommended (all rollers were provided by Dandux, the sole supplier of 4-Poster equipment) and both he and I have already addressed this with the company. We pointed out the significant amount of squirrel damage we are seeing, and discussed how it is being managed (metal ports, aluminum flashing, branch removal or

adjustments in placement). Based on our Shelter Island experiences we will be making recommendations on improvements to the device.

The issue of acaricide resistance in ticks has been raised. The issue of resistance often arises with other pests, the most notorious Long Island example being Colorado potato beetle, and has been an important factor influencing development of pest management programs including Cornell's in Suffolk County, where we are implementing and researching pheromone-based mating disruption, biological control, non-specific insecticides (like insecticidal soap and horticultural oils) and other technologies to address resistance and environmental issues associated with pesticide use. Resistance can arise in several ways, including genetic changes affecting the molecular target site of the acaricide or via metabolic pathways (both are known in ticks); some insects may even modify their behavior to avoid contact. Risk of developing acaricide-resistant tick populations can be related to a variety of factors, such as application frequency, proportion of the tick population that escapes treatment, interbreeding of tick populations exposed and unexposed to treatment, persistence and mode of action of the acaricide, and other natural control factors (biological, environmental). While I have found no reference to acaricide resistance in either of the two main tick species on Shelter Island (there is one non-specific reference to cyclodiene insecticide resistance in lone star tick from Oklahoma), the literature has numerous references to acaricide resistance in ticks, including several to pyrethroid acaricides. The issue should be taken seriously, especially where a large proportion and all stages of the tick population are exposed to treatment. In my opinion, this alone doesn't necessarily argue against the use of pyrethroid acaricides (such as permethrin, bifenthrin and cyhalothrin) commonly used for tick control on Shelter Island, but instead points out the need for an integrated (preventive, biological, etc.) approach to managing ticks and tick-borne disease, and for research to develop a variety of appropriate alternatives. As I have stated in the past, consideration should be given to research and development needs in this area by all those concerned with tick and tick management.

Deer Research

We are currently examining data regarding deer browse impact on natural and ornamental vegetation and deer-vehicle collisions related to 4-Poster device placement and use on Shelter Island compared to North Haven where devices are not used. These are 2 of the 6 issues related to 4-Poster device use and human and wildlife-associated risks due to changes in deer movement and behavior as detailed in the 4-Poster Scope of Study (Shelter Island Town website posting: http://www.shelterislandtown.us/Gallery/Forms/129.pdf).

Deer and non-target wildlife use of 4-Poster devices on Shelter Island are monitored on a monthly basis and will continue through November 2009. Similar to monthly surveys conducted during 2008, we have observed the highest levels of device use by deer, raccoons, squirrels, and birds. Direct contact with treated rollers occurs consistently by deer and raccoons and occasionally by squirrels but has not been observed by birds.

As you know, deer are ear tagged and/or collared on both Shelter Island (4-Poster treatment site) and North Haven (control site). We continually track and monitor the movement of our collared deer to provide information regarding deer behavior and any potential changes in movement related to 4-Poster device use. The use of collars and ear tags allows us to identify individuals and monitor interesting deer movements. Roughly 15 deer trapped and ear tagged in either the northern or southwestern portions of Shelter Island are now residing in Mashomack Nature Preserve. These deer will continue to be monitored and their movements between Mashomack and the rest of the island will be documented. During June 2009, 2 of our tagged does from North Haven were observed in Amagansett, NY and reported to us by residents of Amagansett. These deer traveled up to 15 miles

from the location they were originally trapped and ear tagged. Often, we rely on assistance from residents to locate deer with only ear tags (no collar). Some residents diligently report their observations and their efforts are greatly appreciated. Please continue reporting deer observations to Cornell (email: shelterisle12@optimum.net or phone: 631-749-0896).

We are currently planning our permethrin residue sampling for 2009 and 2010. A revised Objective II (from the Scope of Study) is anticipated by the end of July or August 2009.

References

Brown, A. W. A, 1971. Pest resistance to pesticides. In: Pesticides in the Environment. White-Stevens, ed. 1: 457 – 552. Cited in Arthropod Pesticide Resistance Database (APRD) http://www.pesticideresistance.org/ accessed 5/20/09.

Foil, L. D. et al. 2004. Factors that influence the prevalence of acaricide resistance and tick-borne diseases. Veterinary Parasitology 125:163 – 181.

George, J. E. et al. 2008. Acaricides for controlling ticks on cattle and the problem of acaricide resistance. In Ticks, Biology, Disease and Control. A. S. Bowman and P. A. Nuttall, eds. Cambridge Univ. Press p. 408 – 422.

Figure 1. Left photo: lone star tick adult male (L) and female (R). Right photo: lone star tick nymph

Figure 2. Blacklegged (deer) tick nymph. Ticks pass through four stages: egg, larva, nymph, adult. Nymphs and adults are capable carriers of the Lyme disease pathogen.