Survey of Insect Species Associated with Dog Parks in College Station, Texas

Autumn Eilers
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Abstract: For a span of 4 weeks between March and April of 2015, insect traps were set up in 3 different parks identified as canine stations or dog parks by the City of College Station Parks and Recreation Department to determine the threat of vector borne disease from mosquitoes. Mosquitoes were the intended target of this survey, however no specimens were collected. Other insects that came to the traps were surveyed instead. Homemade traps using brown sugar, water, and yeast were implemented. 10 species were collected, from the orders Diptera, Coleoptera, Lepidoptera, and Hymenoptera. The insect with the highest occurrence from collecting were *Drosophila* spp.. No species that were found pose a direct threat toward canines in the sampled outdoor areas.

Keywords: Survey, Dog, Park, College Station, *Drosophila* spp., Trap

As the weather begins to warm up, many people will start to enjoy time outdoors, especially in parks. The city of College Station is made up predominantly of college students, and many of these students own dogs and enjoy the social aspect of dog parks. Dog parks are becoming increasingly popular, and time spent in these areas could expose dogs to vector borne diseases.

Mosquitoes can carry a variety of diseases. For dogs the mosquito poses a threat by its ability to transmit heart worm. Even though only 1.2% of heartworm tests done in the United States come back positive, the few cases that occur experience symptoms of tachycardia, anemia, labored breathing, and heart failure (Brown *et al.*, 2012). Although heartworm cannot be transmitted to humans or from dog to dog, it is still an incredible concern for the pet industry and owners. College Station receives an average of 51 inches of rain a year and maintains an average high temperatures above 90 degrees Fahrenheit in the summer months (U.S., 2015). This weather provides the perfect breeding ground for mosquitoes. Certain mosquito species vector different diseases, and species in the area were studied previously and shown to have predominantly *Aedes sp.* and *Culex sp.* (Choi *et al*., 2014). This study is intended to be different by only surveying "dog parks" specifically. Other athropods of interest were ticks and fleas, which parasitize dogs and feed on their blood. Although these parasites are not often found living outdoors on their own, the close interactions between multiple dogs in parks can cause the transmission of ticks and fleas between animals. This issue merely needs to be addressed through education in the parks themselves. However, if there is a significant risk of mosquito- borne illness or harmful Diptera, such as stable flies or black flies, then it is important to educate the residents of College Station on the possible hidden dangers posed towards their pet dogs at local parks.

MATERIALS AND METHODS

This survey was conducted by using homemade plastic traps. The trap was made from a plastic 2-liter soda bottle (Coca-Cola, Atlanta, Georgia), cut in half with the top inverted and the top facing inward. The bottle was taped together and covered with black duct

tape (Duck Brand, Avon, Ohio), to give it the disguise of a dark mammal. Inside, a mixture of brown sugar (C&H, Crokett, California) and water was placed at the bottom, in order to have a feeding source that would draw insects to it. On top of the water, yeast (Fleishmann's Yeast, St. Louis, Missouri) was sprinkled on top to release carbon dioxide. The CO2 mimics the breathing of a mammal, and provides the olfactory cue disguise of a small mammal. Figure 1 shows a picture of the bottle trap, hanging from a tree in University Park. Three different types of dog parks were used in this experiment, each of which encompassed a 13 mile radius in the College Station area, and had a unique environment. Lick Creek Park was located in South College Station and is a dense forest area with gravel paved trails. This park is secluded from society on 515 acres and is more of a nature preserve. Steeplechase Park is located in the back of a neighborhood closer to Texas A&M's campus, and houses approximately 4 acres of fenced in area for dogs to play in. Each entrance is equipped with strong, tall gates and waste bags for dog excretions. It is surrounded on one side by trees, but it is not heavily wooded, and is in a very urban area. University Park and Canine Station is located in North College Station and is a blend of the other two parks. Although it is structured for dogs and has swimming ponds and open space to play, it is also in more of a forest type area, and was often surrounded by swamp like standing water. These parks were chosen because of their distance from one another, in the attempt to accurately survey the entire College Station area. Figure 2 shows a map of College Station with the 3 parks identified. During the 4 weeks of collection, the bottles were checked 3 times a week and all specimens were collected. The top was removed from the bottle, all water and insects separated through a filter, and insects were placed into a vial (Bioquip Products, Rancho Dominguez, California) full of ethanol. The bottle was then replenished with new brown sugar water and new yeast.

RESULTS

175 insects were collected belonging to 4 different orders, and separated into 10 distinct species. Of those 175, 141 were *Drosophila spp.*, or fruit flies. 5 species from Muscidae and 3 species of Calliphoridae were collected. The second most abundant family of insects collected were Tipulidae. One *Chaetopsis* spp. fly, *Oryzaephilus surinamensis*, and *Cryptolestes turcicus* were collected. Absolutely no mosquitoes were found.

Figure 1: Trap in University Park, March 24, 2015

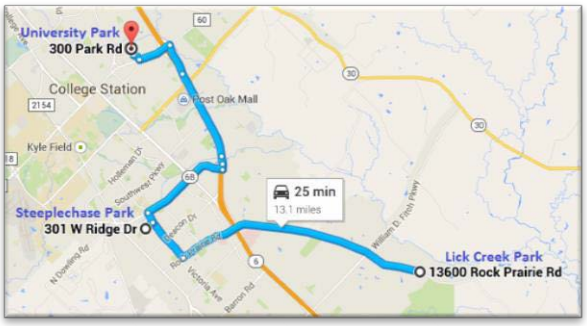

Figure 2: Parks and Locations in College Station, Texas

Species	Number of Species Collected	Steeplechase Park	University Park	Lick Creek Park
Drosophila spp.	141	43	68	30
Camponotus consobrinus	5		5	
Lepidoptera	2	2		
Tipulidae	8	4		4
Tribolium confusum	8	2	3	3
Chaetopsis spp.	1	1		
Oryzaephilus surinamensis	1			1
Cryptolestes turcicus	1			1
Calliphoridae	3		3	
Muscidae	5	1	1	3

Table 1: Compilation of Insects Collected and their Locations

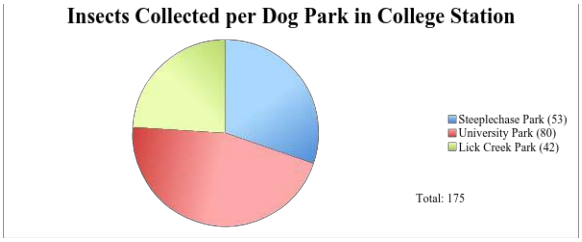

Table 2: Totals of specimens found in each park

DISCUSSION

This experiment was intended to be a originally created in order to survey of mosquito species and to determine possible threats they posed to the dogs in the community of College Station, Texas. However, not a single mosquito specimen was collected from this survey. The ineffectiveness of these traps could have been a result of unfavorable weather conditions and unforeseen disadvantages to the design. Despite this, the traps instead provided other insect specimens from which a general survey was synthesized using the data.

The trap, while not effective for capturing mosquitoes, captured over 175 specimens of other insects in a one month period. Specimens from orders Diptera, Coleoptera, Lepidoptera, and Hymenoptera were found. It is most likely that the yeast proved to be the most prominent attractant for many of the insects collected. Studies have been done linking Tipulidae with cereal grain crop damage (Blackshaw, 1999) and *Oryzaephilus surinamensis* to strong attractions with brewer's yeast (Pierce, 1981). *Tribolium confusum*, the confused flour beetle, has been studied and shown to spend its entire life in or searching for pulverized grains such as flour (Park, 1934). It is of no coincidence that almost every species collected by this trap was attracted to the yeast itself, and not the carbon dioxide that would have attracted mosquitoes.

Drosophila spp. is no different. However, it is not just the yeast that draws them to the trap. Min (2006) and Min (2007) both illustrate the necessity for both yeast and high caloric content, such as sugars, in *Drosophila* diets. This makes the trap used in this experiment a haven for fruit flies, because this trap seemingly provides shelter and also serves as a rich resource for necessary nutrients. This experiment truly tested the validity of "homemade mosquito traps" and their flaws. None of the species collected during this experiment would be harmful to dogs, except from sugar ant bites which are easily treated.

Therefore, although this experiment did not fulfill its original purpose, it did provide the data and methods for an easily made trap for the collection of *Drosophila* and other insects attracted to yeast.

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