Survey of Cockroach (Order: Blattodea) Species Infesting A Home in Houston, Texas

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Abstract The purpose of this experiment was to determine the species of cockroaches that infest different parts of homes located in north Houston. To do this, cockroach traps were laid out in different rooms of the house. Each night for one week, and the specimen caught within the past twenty-four hours were removed from the traps and their species were determined. The number of cockroaches caught per location per night was recorded. It was concluded that the most prevalent species infesting houses in Houston, Texas was the *Periplaneta Americana* (Blattodea: Blattidae) (Linneaus) cockroach, commonly known as the American cockroach. The most infested area of the house was determined to be the attic.

Key words: cockroach, American, infestation, Houston, insects

Cockroach infestations have caused problems for people around the globe for centuries. These pests can be extremely difficult to get rid of, so it is important to be as informed as possible about their habits and location preferences. In order to eradicate them from a home, one must first determine where in the home they are most likely to be found.

Even the cleanest home in the world is susceptible to a cockroach infestation. These infestations are a problem because cockroaches are huge vectors of disease, and many people are allergic to cockroach dust (Raulf et al 2014). An infestation of cockroaches will result in there being large amounts of cockroach dust present in the home, therefore resulting in a higher chance of a person coming into contact with the dust and having an allergic reaction (vanWijnen et al 1997). These allergic reactions can impede upon not only quality of life of both children and adults, but contain the potential to cause serious health problems (McConnell et al 2005).

Another place where the presence of cockroaches causes problems is in schools. In 2009, several North Carolina schools were surveyed to determine levels of cockroach dust and numbers of cockroaches in places such as the classroom and food service areas. They determined that the food service areas were the location in which the highest amount of cockroach dust and highest number of cockroaches were found (Nalyanya et al 2009). A cockroach infestation of food preparation areas increases the likelihood of people in schools, both teachers and students, coming into contact with cockroach dust. This then increases the likelihood of an allergic reaction occurring. This study also determined that the most effective way to eliminate cockroach infestations is "education, cleaning, and pest control"

(Nalyanya et al 2009). By educating people about cockroach behavior, making sure places where they are known to collect and infest are cleaned, and using proper insect control methods to eradicate them, it is easier to prevent an infestation.

One other study investigated the presence of cockroaches in hospitals. Having cockroaches present in a hospital is especially dangerous due to their ability to vector diseases and their allergenic capabilities. A vector with these attributes present in an area containing a large number of immunocompromised individuals can be devastating. An experiment that studied hospitals in Sao Paulo, Brazil determined that integrated pest management, including the use of insecticides and education, is the most effective method of cockroach control in hospitals (Cintra-Socolowski et al 2015).

In the United States, the cockroach most commonly found infesting homes is the German cockroach, or *Blattella germanica*. These are especially prevalent in low-income communities, particularly in apartments (Wang and Bennett 2009). To eradicate these, Wang and Bennett found in their 2009 study that the use of E-IPM traps, consisting of cockroach gel bait, boric acid dust, and sticky traps, was very effective.

A cockroach found in many Texan home infestations is the American cockroach, or *Periplaneta americana.* This cockroach is medium to dark brown in color, and generally measures about four centimeters in length. They are often found in commercial buildings. This cockroach is the second most abundant cockroach found in North America (Barbara 2014). There are many ways to control this pest, but the most recent research has been focused on finding an environmentally friendly way to destroy these pests. Oftentimes, pesticides can have extremely negative, unintentional effects on the environment, so finding a method of cockroach control that does not harm the environment is imperative. One recent study discovered that using potassium alum as an insecticide was very effective and eco-friendly way to combat infestations of the American cockroach (Salama 2015).

Materials and Methods

First, the cockroach traps were assembled in a house in Houston, Texas. A cockroach trap consisted of a mason jar (Walmart, Bentonville, Arkansas) containing a piece of bread soaked in beer (Walmart, Bentonville, Arkansas). The the inner rim of the mason jar was coated in Vaseline (Walmart, Bentonville, Arkansas). The bread was soaked in beer because Dr. Brundage of the Texas A&M Department of Entomology noted that cockroaches are particularly attracted to beer (Brundage 2016). The inner rim of the jar was coated with Vaseline to prevent cockroaches from climbing out of the jar after they had fallen into the jar. Forty-nine of these traps were assembled; one for each day of the week in each of the seven locations.

On the bottom of each jar, upon a piece of tape (Walmart, Bentonville, Arkansas), the day of the week in which the trap would be put out was written. The days of the week were written colors corresponding to the location in which the jar would be placed. The color corresponding to each location was labeled on a key. There were seven locations in which traps were placed: the kitchen, the bedroom, the bathroom, the office, the attic, the garage, and the yard. Twenty-four hours after the first seven traps had been set out, they were collected and replaced with new traps. This cycle was repeated for a week.

After the collection was completed, the number of cockroaches trapped was recorded on a spreadsheet. The total number trapped in each location was noted. The species of cockroaches trapped were identified.

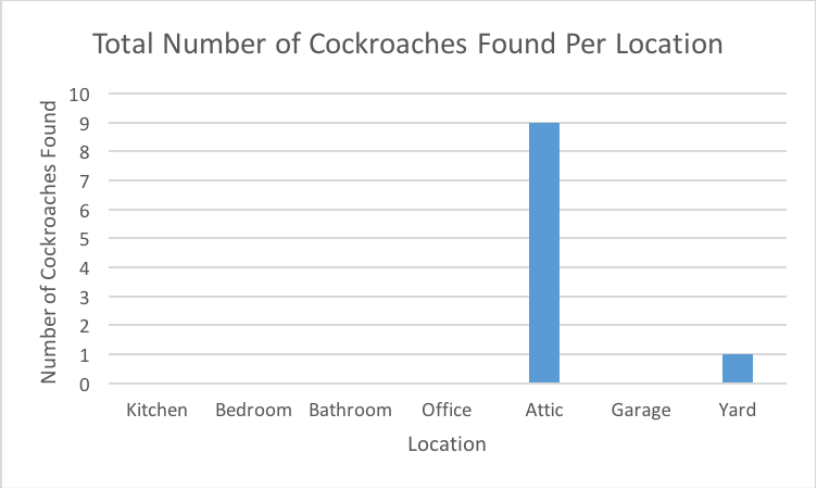

Table 1: Number of cockroaches found in tested locations

Location	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total
Kitchen	0	0	0	0	0	0	0	0
Bedroom	0	0	0	0	0	0	0	0
Bathroom	0	0	0	0	0	0	0	0
Office	0	0	0	0	0	0	0	0
Attic	0	1	0	0	0	4	4	9
Garage	0	0	0	0	0	0	0	0
Yard	0	0	0	1	0	0	0	1

Table 1: Locations of Roaches found during the week.

Results

It was determined that the American cockroach was the species prevalent in the infestation studied. The location in which the highest number of cockroaches was captured was the attic. The only places in which cockroaches were found, as shown in Table 1 and Figure 1, were the attic and the yard.

Discussion

These results indicate that *Periplaneta americana* is the most prevalent species infesting homes in the north Houston area. In addition, it was determined that the attic was the most infested room of the home. This is most likely due to the small amount of human activity that occurs here compared to the other areas of the home. Because this area is relatively undisturbed, it is a safe place for these insects to develop and reproduce.

These findings were not expected. Generally, cockroaches are more commonly found infesting moist areas of the home such as kitchens and bathrooms. In this study, cockroaches were found in neither the kitchen nor the bathroom. This may have been due to the placement of the traps within each of these rooms.

From these findings, it was determined that the attic is an area highly susceptible to cockroach infestation. This is important to know so that a person attempting to eradicate a cockroach infestation will be sure to target this area when setting out traps and spraying insecticides. It was also determined that the American cockroach is an important species to focus on when planning control techniques for homes in Houston, Texas.

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