

## **Fire Ant Experiment**

**March 12, 2019**

The fire ant experiment on September 25, 2018 at the Williamson County AgriLife Extension property and the Williamson County Demonstration Gardens was begun by Master Gardeners Sonia Schuetze and Rick Halle. The demonstration vegetable garden vegetables are grown and donated for consumption and treating fire ants with natural products is of great interest to the gardeners.

The study was started to see how well neem oil, orange oil, and the combination of the two oils would work on the treatment of fire ants in the demo gardens.

Briefly, neem tree seed oil has been used for hundreds of years as a natural pesticide and is currently used in toothpaste, cosmetics, pet shampoos and other products. Neem components are already found in over 100 insecticides and are used on many different types of crops. Once the neem seed is pressed, the resulting oil is separated via an alcohol process. As a result, two active ingredients used in insect control are obtained: Azadirachtin and clarified neem oil. Neem oil products with Azadirachtin as the active ingredient affects insects as a growth regulator, anti-feedant, repellent and works through ingestion. The other component that separates from the alcohol treatment is clarified hydrophobic extract of neem oil or "neem oil" and works by suffocating on contact. In our study, "neem oil" refers to Neem Pro EC with the active ingredient Azadirachtin.

The orange oil used is Medina Orange Oil. The active ingredient is D-limonene which is cold pressed and extracted from orange peels. The orange oil products work on contact as a pesticide by degrading the exoskeleton of insects.

### **Locations and mixtures:**

Three locations were chosen in or near the demonstration garden. The first location was in the compost pile, the other two locations were near the extension building. Each location had different drench mixtures applied. The ant mounds were monitored from September 25, 2018 through November 27, 2018. The logs of our observation are included at the end of this report.

The oils used were the Neem Pro EC and the Medina Orange Oil and added in water to produce the three types of drench used in the experiment.

1. neem oil mix only (3 Tbsp per gallon of water)
2. orange oil mix only (8 Tbsp per gallon of water)
3. combination mix: An equal amount of the orange oil mix and neem oil mix.

## **Summary and Results:**

Our results showed that all three mixtures, neem oil mix, orange oil mix, and the combined mix eliminated the fire ants in the original application area for approximately two weeks. In the compost area, where the combination mix was applied, ant activity was not detected for 5 weeks. In the case of both neem oil mix and the orange oil mix a secondary ant mound appeared in close proximity to the original treatment area by the second or third week following the origin application. We concluded that the fire ant mound moved from the original location to a nearby location. The major difference between the neem oil mix and the orange oil mix is that the orange oil 'burned' the surrounding turf after it was applied.

The combination mix applied in the compost area seemed to have the best results. However, it was difficult to tell whether the ant mound that appeared 6 weeks after the initial application was a secondary mound or a new mound. In addition, the quantity of the drench varied by the location based on the ant mound size.

Another observation we made is that the penetration of the drench seemed better in the compost area versus the turf areas.

In conclusion, our recommendation is to try one of the methods in the demo garden and use the same treatment method for one growing season to test the effectiveness of the treatment.

## Log of Activities:

**9/25/18 temperature 93/74**

The first location was in the compost pile. It was a gigantic ant mound that measured 5'X3'. We used 6 gallons of the orange oil mix and 6 gallons of the Neem Oil mix.



The second location was in front of the extension building—close to the sidewalk. The fire mound was small and measured 12"x10". We poured 2 gallons of the orange oil mix.

The third location was also in front of the extension building but closer to the building. The fire mound was small and also measured 12"x10". We poured 2 gallons of the Neem Oil mix.



Rick is going to check the three locations next week and note any increase or decrease in ants/activity. May want to put some kind of food source like a chip or piece of hot dog. Once the evaluation is made, then he will apply another round of drench. We will check the following weeks but do not plan to apply any more drench mixtures.

**9/28/18 temperature 83/60**

There was no activity Friday at the fire ant mounds Sonia and I treated on Tuesday. I took pictures but did not do any additional treatment. The Orange Oil burned the grass but the Neem did not. We used some compost from near that treatment but there was no evidence that the mound moved. There was some ant activity about 3 feet from the orange oil treatment but I'm not sure if that mound was there Tuesday or not. This rain on Saturday will force them to pop up again so we will see where they are next week.

### **10/2/18 temperature 87/72**

In the area previously treated for fire ants: the mound at the compost pile had no activity, the mound treated with neem had no activity, the mound treated with orange oil was not active but two additional mounds within two feet of it are present and active – I assume they just moved over.

### **10/5/18 temperature 89/73**

The mounds previously treated by the extension office are the same as Friday. The Neem treated mound is inactive and the grass is lush. The Orange oil treated mound is inactive but the grass is yellow and the two new nearby mounds are active. An active mound in the middle of row two was treated with Neem. An attempt was made to treat fire ants in one of Sheila's raised beds with Neem, but there is no well-defined mound so the treatment was dispersed where I saw ants. I don't know if that will be effective.

### **10/9/18 temperature 80/65**

The combination **Neem/Orange** application on the compost pile still had no activity. We also checked the perimeter out to a couple of feet in each direction and did not see any ants.

**The orange only** mound had no ant activity on the original mound but there were three new mounds within 4'. Of these, two had no activity and one was very active.

**The neem only** mound had no activity in the original location and there was a new mound about 1.5' away with a little activity with few ants.

In addition to the original locations, a neem only treatment was used along one side of Sheila's garden last week. On Tuesday we treated an ant mound next to the pepper bed (bed 2?) and one near a peach tree.

### **10/23/18 temperature 68/54**

The compost area originally treated with Neem/orange application showed no signs of ants. A large portion of the compost next to the treated area has been used and no ants were seen. The ant mound treated with the orange only still had no signs of ants. The adjacent mound seen after the initial application had no signs of ants. The neem only area showed no ant activity on the original mound but the adjacent mound located about 18" away had ant activity and was treated with Neem only.

### **10/30/18 temperature 84/68**

Also, a quick update on the ant experiment. We found that the compost pile had ants—very far from the original location and Rick treated with neem oil last week. The 'orange' only pile showed no ants in the original but we found ants in the secondary mound and will treat when we get more orange oil. The neem oil only location that was treated a second time on 10/30 had no ants in either mound.

### **11/20/18 temperature 61/35**

Orange only area at the secondary location needs to be retreated. Out of orange oil.



### 11/27/18 temperature 63/29

Just a quick update from today. The original locations- neem/orange oil combination (all of the compost in this area have been used), neem oil only, orange oil only had no signs of ants today. Last week there was activity at the secondary mound for the orange oil only location so maybe the cold weather has the ants going deep. The compost pile had lots of ants about 2 yards away from the original location. It was hard to tell exactly where the center of the mound was but it was treated with a combination neem oil and orange oil. Best guess:)

In addition, there was a mound next to the garlic bed and it was treated with orange oil only. It looked like someone had treated with granules in the bed before.

Maybe with the weather warming up later in the week we will see more activity.

