

A Comparison of Larvicide and Garlic Mineral Salts on Horn Fly Populations

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Background

There are many ways to control and prevent horn fly infestations. Some include larvicides, introducing garlic to the cattle's mineral, or adulticides. Larvicides are a method to control developing horn fly larvae. Most larvicides are sprayed directly on infested manure. Others can be administered as a feed additive or bolus. Many of the larvicides on the market were developed specifically for horn flies and other filth flies developing in the manure. Garlic is a pre-mix mineral or can be mixed in mineral or salt, normally at a concentration of 2% garlic. Garlic powder contains a mixture of volatile sulfur-based bioactive compounds which have been shown to exhibit insect repellent and anti-viral properties. Adulticides are topical insecticides applied directly to the animals consist of ear tags, residual livestock sprays, pour-ons, dust bags, back rubbers, oilers or wipe-ons.



Problem Statement

The adult horn fly is 3-5 mm long with piercing bites that are painful to cattle. Both the male and female horn flies feed off the cattle by bloodsucking. The adult horn flies are prevalent and persistent in keeping contact with the cattle, resting on them between feedings. They can be seen on the withers, back and side of the cattle and will move to the belly during the hottest parts of the day. Infested cattle react by licking their backs, twitching their flanks, switching their tails, and kicking their bellies with their hind legs.

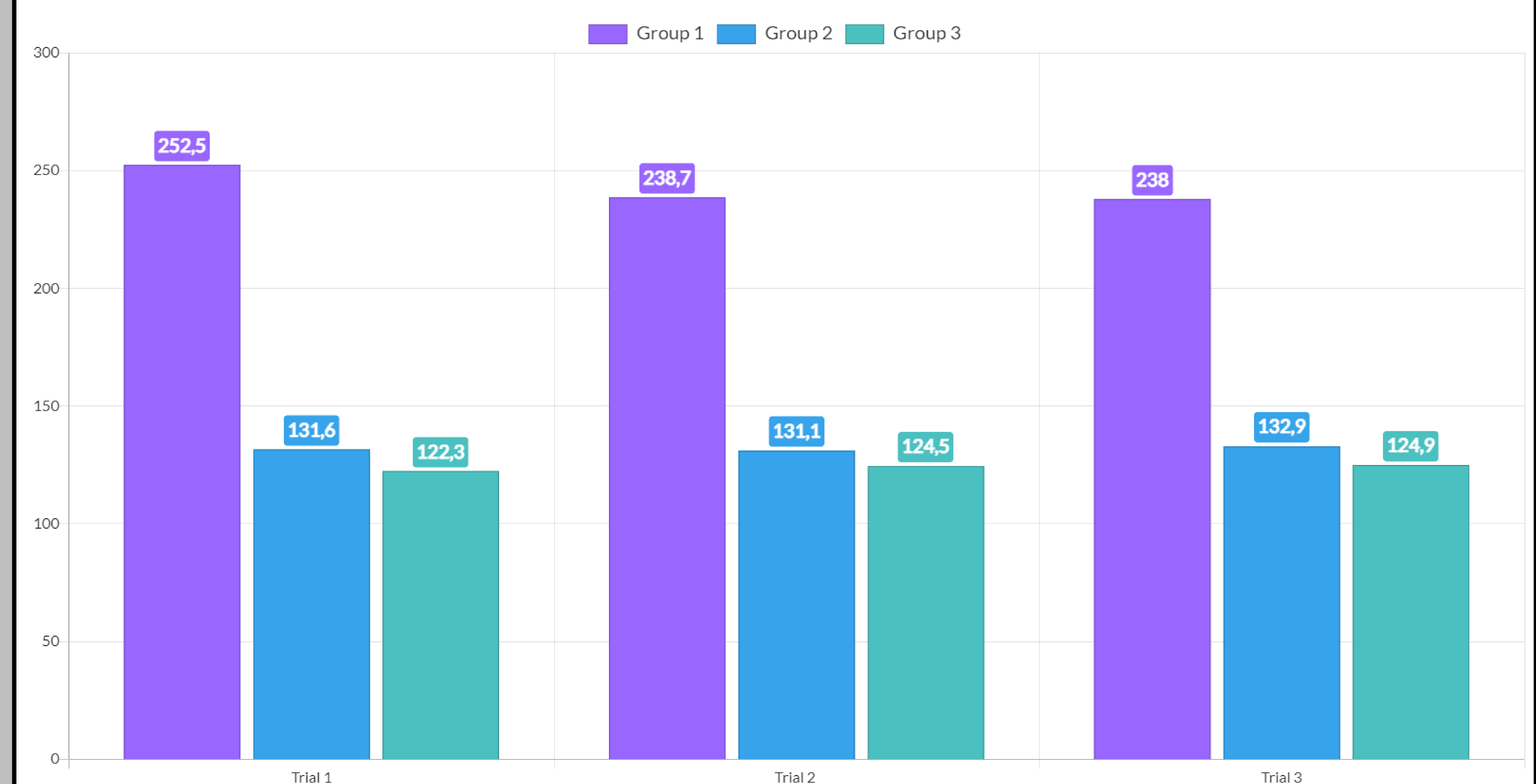
According to a study conducted by Texas A&M, "metabolic and behavior responses indicate that horn flies increase the amount of energy spent by cattle when defending themselves, leaving less energy available for growth." This type of exhaustion also impacts the cattle's weight, milk production in dairy cows, and overall health.

Horn flies have been identified as a developmental carrier for *Stephanofilaria stilesi*, a spirurid nematode that causes stephanofilariasis in cattle. Stephanofilariasis is a granular dermatitis that occurs mainly on the belly, scrotum, prepuce, and udder of cattle.

Methods

For this research project, we studied three separate pastures containing Fort Hays State University's Holstein cows. One pasture was our control group, with no horn fly protection applied. Another pasture had cattle that were fed with garlic in their mineral salts, an all-natural horn fly prevention method. Our final pasture contained cows sprayed with a larvicide. Throughout the late summer and early fall of 2023, we went out to each pasture and took pictures of ten cows per pasture. Then, using a software imaging program called GIMP, I counted each fly on each cow, keeping track of the ear tag numbers. The cows were always photographed from the east side, and at the same time of day. The first data collection occurred on July 3, 2023. The temperature was 77 to 78 degrees F. We began at 7:33 AM. The second data collection occurred on July 31, 2023. The temperature was 77 to 78 degrees F. We began at 7:37 AM. The final data collection occurred on September 28, 2023. The temperature was 61 degrees F. We began at 7:49 AM.

Chartle Bar Chart



Findings

After collecting all the data, I created a bar graph with each group assigned a color. Each trial number is found along the x-axis. The average number of flies for each group is shown on the y-axis. As the graph illustrates, groups two and three were fairly similar, but group one was distinctly higher. The average fly count for group one was 243. The average fly count for group two was 132. The average fly count for group three was 126. As you can see, group one had nearly twice as many flies as the other groups. Based off of the evidence of our findings, it is safe to assume that group one was the control group. Additionally, we can determine that there is no statistically significant difference between using larvicide or garlic in mineral salts.