INTRODUCTION

Stomoxys flies (biting or stable flies) are pests that primarily blood-feed on cattle and other farm animals. These pests can also try to feed on humans whenever their primary hosts are not around (J. E. Cilek). These flies are more attracted to certain colors than others, which is how they choose what animals to land on more frequently (J. E. Cilek). A study was performed to show what colors they chose to land on the most, out of blue, red, orange, black, and three shades of white, blue was landed on significantly more than any other color (J. E. Cilek). Blue was landed on the most because flies are more attracted to colors that absorb light (Waterhouse, DF). The colors that *Stomoxys* are attracted to is why they primarily land on brown and black colored animals, instead of white (Tombak, K.J., Gersick, A.S., Reisinger, L.V. *et al*). The way that *Stomoxys* eyes were evolutionarily structured could be the reason behind their color attraction (Masters, Madeline).

Could end sentence: ...land on the most. Out of blue.....

Since Stomoxys are attracted to colors that reflect less light, they primarily land on brown or black animals rather than white.

Is there any research saying that this structure is related to color attraction?

Maybe add paragraph explaining what you are testing and how it would be evolutionary. And clearly state your hypothesis.

MATERIAL AND METHODS

The data presented in this paper comes from "Zebras of all stripes repel biting flies at close range" by Kaia J. Tombak and a team of scientists. They performed this study to further confirm that zebras evolved their stripes to repel the biting flies. To do this, they collected sections of zebra and impala skin from carcasses found at the Mpala Research Centre. They took about a 400 cm^2 skin sample from the rumps of one plains zebra (PZ) and one Grevy's zebra (GZ). The impala (IM) sample was taken from the flank of an impala carcass due to the rump not being large enough. Muscle and fat were cleared off the samples, the samples were treated in salt, and sun dried (Tombak, K.J., Gersick, A.S., Reisinger, L.V. *et al*).

and then they were treated

Local biting flies were collected by using Nzi traps that were baited with fresh camel urine and milk. The traps collected flies for 6-24 hours until the number of flies was sufficient.

To ensure that the flies were hungry for the experiment, they were collected from the traps and held for 12 hours before the experiment began. Before beginning the experiment, the team identified that these flies were of the *Stomoxy* species (Tombak, K.J., Gersick, A.S., Reisinger, L.V. *et al*). How did they identify the species of the flies?

To be able to count the number of flies landing on each sample of skin, this experiment took place in a controlled, rectangular Plexiglas box. At each end of the box, there was a removable piece of wood that prevented fly escape but also allowed oxygen into the box. For each trial, a piece of animal skin was hung in front of the wooden piece and held on by a clothespin. took place between 8:30-10:30..... The trials were ran at 8:30-10:00am and 3:00-4:30pm as these are the times *Stomoxy* flies are the most active. A closed petri dish that contained 15-20 flies was placed in the center of the box and the lid was removed by lifting it off with fishing line threaded through a hole in the lid. The flies settled on their animal skin sample of choice and the results were recorded. It was noted on the zebra skin if the flies landed on white or black stripes. After the data was recorded, the team tapped the box to disturb the flies and have them re-land. This sub-trial was repeated 10 times in each trial (Tombak, K.J., Gersick, A.S., Reisinger, L.V. *et al*).

Each trial consisted of a different combination of the animal skin samples; Grevy's zebra skin vs. plains zebra skin, plains zebra skin vs. impala skin, and a Grevy's zebra skin vs. impala skin. Recorded landing data was combined into an average per trial and were compared using a Wilcoxon Rank Sum test (Tombak, K.J., Gersick, A.S., Reisinger, L.V. *et a*). The data in this paper was presented using a Chi-squared analysis. The equation for a Chi-squared analysis is $X^2 = \sum \frac{(O-E)^2}{E}$; where O is the observed values and E is the expected values. The Chi-squared analysis is a statistical test used to determine if events are caused by random chance.

RESULTS

Maybe add some info if possible just so there is more than one sentence for each figure.

Figure 1 represents a molecular phylogenetic analysis showing classification of Muscidae.

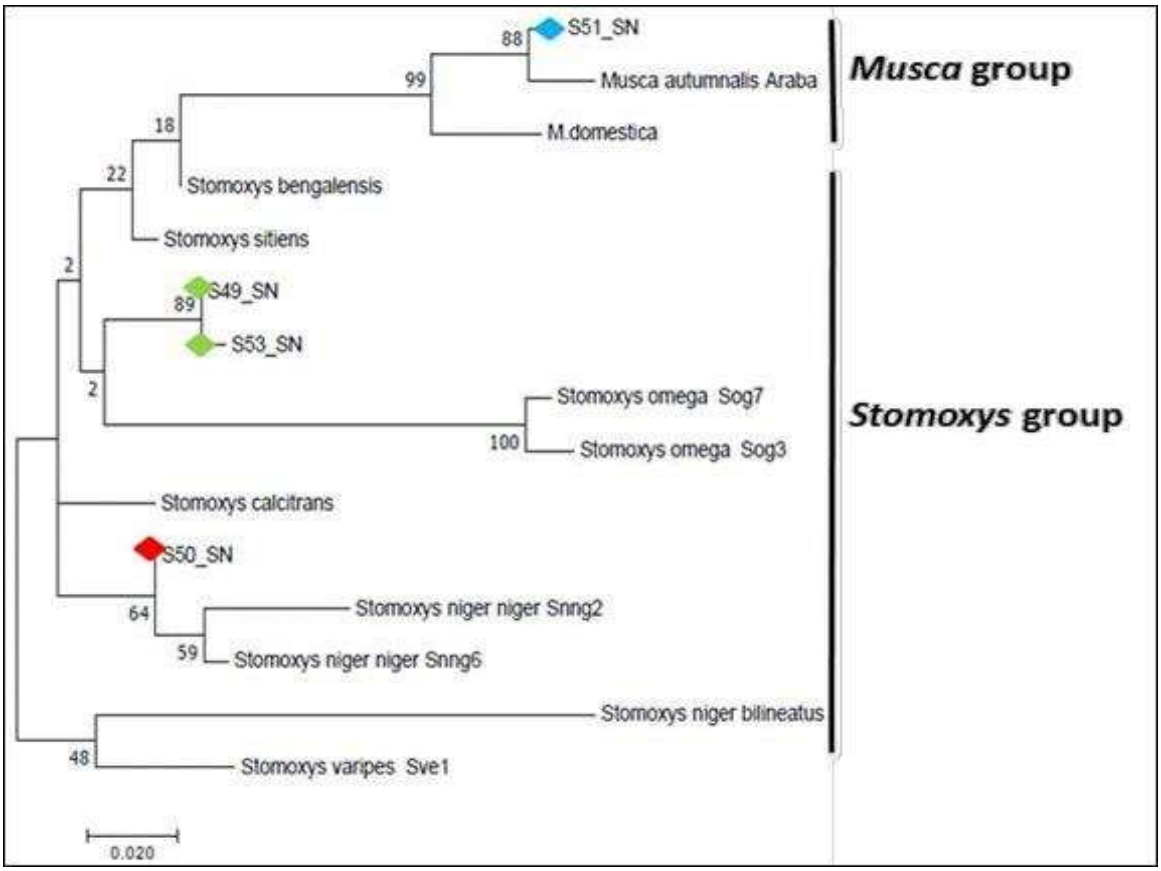

Figure 1: A phylogenetic tree from Molecular identification of Stomoxys and musca (Diptera: Muscidae) of veterinary importance in the pasture area of Ngaoundere.

Is there different species of flies being tested? If not, why is this tree needed? If so, describe the difference in results for each species to compare and see if the change is the same in all species. If it is the same throughout species, then you could say that it is evolutionary because it is impacting multiple species to alter the colors they are attracted to. May need to describe why this is important or what implications it has about this becoming evolutionary (probably include in introduction or discussion)

while in the box.

Figure 2 shows the percentage of how often the flies landed on what color in the box. The values of white and black from each zebra type were combined.

Could state some of the data found, but not sure if its needed since its easy to read in the pie chart.

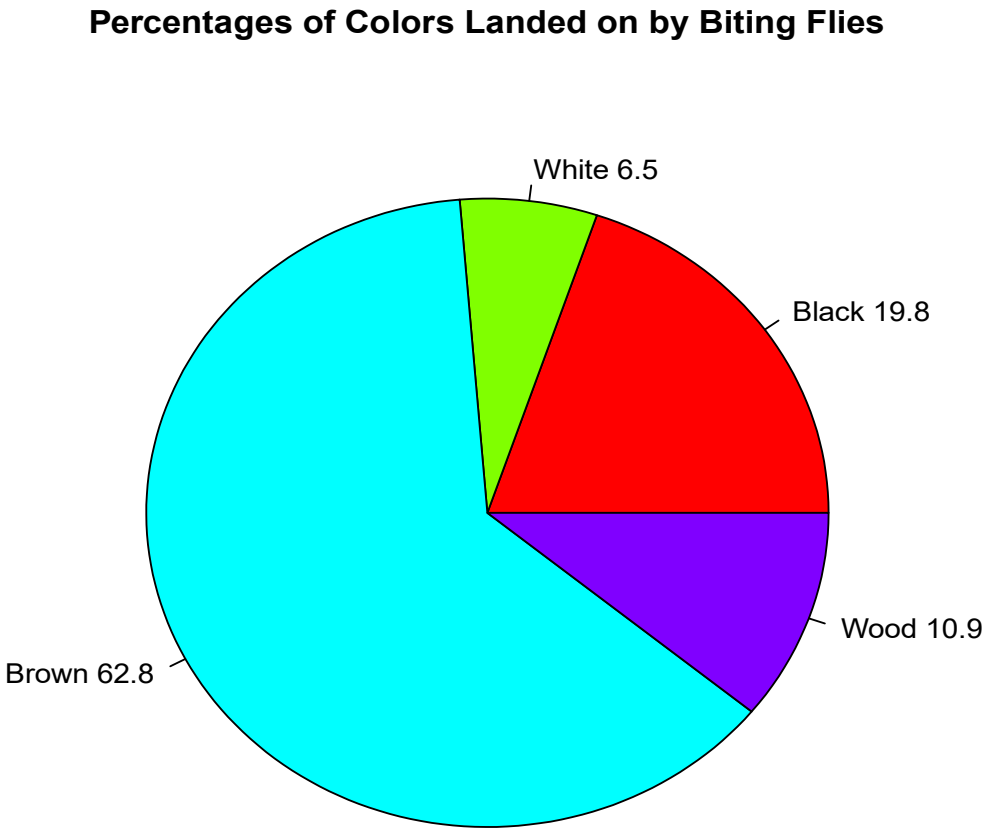

Figure 2: The percentage of how often flies landed on what color.

Table 1 represents the averages of the recorded landing data during the trials.

	Lands on black	Lands on white	Lands on brown
GZ	177	60	0
PZ	187	59	0
IM	0	0	1155
Wood	0	0	195

Table 1: raw results of average landing data collected from the trials.

Table 2 represents the results of a 95% confidence interval Chi-squared analysis test performed to determine if the landing values were due to random chance or by choice.

Degrees of freedom	6
P-value	2.2×10^{-16}
Theoretical value	1.635
Chi-squared analysis value	1833.4

Table 2: results and values of Chi-squared analysis.

DISCUSSION

The results of the Chi-squared analysis at a 95% confidence interval show that the flies landed on certain colors by choice and not by random chance, since the Chi-squared analysis value is greater than the theoretical value. The calculated percentages show that 62.8% of the time the flies landed on the impala skin sample. The second most chosen color was black at 19.8%.

I would add in any weaknesses in the study or potential issues. Possibly mention that it would need to be tested in a species with a different eye structure to see if this is what is influencing the color preference or if there are other factors impacting which color they favor.
Could also talk about why these colors were chosen more frequently, like which colors reflect light the most, etc. Also talk about what these findings could mean and how finding that it was not due to random chance determines that the findings were evolutionary.

CONCLUSION

The evolution of a fly's eye shape and structure affects the way they see life and see color. All insects have ommatidium structures in their eyes, this structure helps adjust the intensity of light (Olesen, Jacob). *Stomoxy* flies have a large distribution of ommatidium to adjust the intensity of light they can see since they can also see UV light (Olesen, Jacob). The large amount of ommatidium will have them be more attracted to colors that do not have an intense light reflection, such as black or brown in the experiment.

I would mention how the results agree with these conclusions, supporting your initial hypothesis. Not completely re-describe the experiment but hit the key points and key results that show that this is true. I would also consider making an abstract at the beginning rather than having a conclusion and then merging some of this info into your discussion, but that is just an option of how to reformat, not necessary at all.

References

J. E. Cilek. "Attraction of Colored PLASTICIZED CORRUGATED Boards to Adult Stable Flies, *STOMOXYS CALCITRANS* (Diptera: Muscidae)," *Florida Entomologist* 86(4), 420-423, (1 December 2003). https://doi.org/10.1653/0015-4040(2003)086[0000:AOCPCB]2.0.CO;2

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