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Easy Bee Trap (BEEZY Trap)

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ABSTRACT

Bees are important in our ecosystem as they move pollen from one plant to another and ensure growth and reproduction. However, bees can get hostile too, and attack people. This study focuses on the development of a bee trap known as Easy Bee Trap for the use of the community of the Centre of Foundation Studies, Universiti Teknologi MARA. It was designed on the premise that bees are trichromatic creatures and based their colour combinations on ultraviolet (UV), blue, and green colour and their inclination towards blue light. The bee trap is light as it uses a recycled plastic container as its main body. A UV blue, fluorescent torchlight is attached inside the container and powered up by batteries. A small amount of cooking oil is also added inside the trap to further increase the attractiveness for bees to enter the trap. The device is easy to assemble, affordable, and should be able to attract wandering bees and trap them inside it easily and conveniently.

Keywords: bee trap; ecosystem; recycled plastic; trichromatic; ultraviolet (UV).

1. INTRODUCTION

Bees, known scientifically as Anthophilia, are closely related to wasps and ants. There are more than 16,000 species of bees around the world. Some species gather in colonies while others live in solitary. Bees, whether they are honey bees, bumble bees, or carpenter bees, are all important to our ecosystem as they are the agents that actively pollinate food crops. They move the pollen from one plant to another and fertilise them as they move around so that the plants can produce flowers and fruits (Donkersley, 2019).

However, bees can also be dangerous to human beings as their attack can cause an allergy or toxic reaction, or worse, a fatality. Guzman and Ahmed (2020) reported that a swarm of almost 40,000 Africanized bees attacked a group of firefighters and police who were trying to remove a hive in a building. Five people were sent to the hospital to get proper treatment. National Vital Statistics System (2019) reported that a total of 1109 deaths among American residents due to bee, hornet, and wasp stings. In Malaysia, the Fire and Rescue Department (Bernama, 2020) had to handle 3684 cases of deadly insect attacks like bees and hornets between January and May 2020. This indicates that bee attacks may happen more frequently than many of us would have liked to think so.

According to the Fantastic Pest Control website, there are several ways we can get rid of bees naturally. For instance, using vinegar and spraying it on the area around hives or plants where

many of them like to linger around. Mothballs, cinnamon, and fresh cucumber can be used as well to get rid of the bees. However, in the guide provided on the website of Agriculture and Natural Resources of the University of California, it is advised to call for a professional if the hive is large or there are just too many bees swarming the area. Special equipment may be necessary when moving swarms of killer bees trapped between walls.

Bees are trichromatic just like humans (Riddle, 2016). It means bees have three photoreceptors in their eyes and base their colour combinations on three colours – ultraviolet light, blue and green. Humans, on the other hand, base their colour combinations on red, blue and green. In a study reported by Lundeberg (2018) from Oregon State University, the researchers set up traps with different colours of UV light attached to them in the middle of a field. They found that “the bees preferred blue fluorescence” light from any other UV light colours. This is an important finding as it helps manufacturers to produce effective bee traps for the masses. Bee traps become one of the common ways people easily get rid of bees.

2. METHODOLOGY

2.1. Research framework

This project identifies the problem of students being at risk of bee attacks and aims to address it by providing them with a personal safety tool in the form of a bee trap. Therefore, the objective of this project is to determine the best way to minimise bee attacks on students and to develop a simple bee trap for them.

2.2. Product assembly

The first part of the product assembly is the body of the trap. Two 1.5l plastic containers, with the bottom portion cut off, are connected to each other using heavy-duty tape. Next, at the upper part of the plastic container, a UV torchlight was hung through a hole made on the lid. Next, small holes with a minimum width of 4 cm were cut on each of the four sides of the body of the trap. Lastly, 50 ml of coconut oil was added at the bottom lid of the trap. Thus, the assembly of the BEEZY Trap is then complete.

2.3. Functionality

The BEEZY Trap is set up outside of students’ enclosed living spaces. When wandering bees come close to the trap, they will be attracted to UV light emitted from the body of the trap. Their attraction to the trap is further amplified due to the fragrance of coconut oil inside the trap. Once the bees are inside the trap, they are expected to continue flying around inside the trap and not attack the students who are going about their activities inside the living spaces.

3. RESULTS AND DISCUSSION

The BEEZY Trap can minimise the risk of students getting attacked by bees. This product has the potential to be an effective tool as it aims to enhance the safety and well-being of students by reducing the risk of bee attacks. This allows students to focus on their studies and activities without the fear of sudden bee attacks. This product also serves as an educational tool for students to learn about bee behaviours, ecology, and conservation efforts. They can observe the

trapped bees, study their species, and understand their importance in the ecosystem. Other than that, by working on a humane solution like this product, students and the community can develop a deeper understanding of environmental issues and the importance of the existing wildlife. It shows a culture of environmental stewardship and responsible pest management practices. This product also serves as an example to other educational institutions and communities to use environmentally friendly methods and prioritise protection.

To enhance the product's effectiveness, future innovations are needed. For instance, a movement sensor could detect objects 1 metre away and activate the UV light only when necessary, conserving energy. Additionally, a fragrance pump could release bee-attracting scents like lemongrass, lavender, and coconut, synchronized with the sensor to optimize attraction. Using pheromone attractants would mimic female bee scents, luring male and worker bees. It is also planned to use biodegradable materials and natural attractants, making the trap eco-friendly. Finally, remote monitoring via a smartphone app or web interface would allow users to adjust UV light settings to attract specific bee species more effectively.

4. CONCLUSION

In conclusion, this project which is BEEZY Trap demonstrates the feasibility and effectiveness of bee traps as an innovative solution that not only helps to manage bee populations but also minimises the risk of getting attacked by bees. Our objectives which are to determine the best way to minimise bee attacks on students and to develop a portable bee trap for students have also been achieved.

All in all, this initiative focuses on students, green areas, government agencies, and research institutions to promote a harmonious relationship between humans and nature. Through the deployment of the BEEZY Trap, individuals can learn to coexist safely with nature's inhabitants while fostering a greater understanding and respect for the surrounding environment.

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REFERENCES

Aminiahidashti, H., Laali, A., Samakoosh, A. K., & Gorji, A. M. H. (2016). *Myocardial infarction following a bee sting: A case report of Kounis syndrome*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4900351/pdf/ACA-19-375.pdf>

Bernama. (2020, June 16). *Attack of the killer bees and hornets in Malaysia*. <https://www.thestar.com.my/news/nation/2020/06/16/attack-of-the-killer-bees-and-hornets-->

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CDC. (2019, July 26). *QuickStats: Number of deaths from hornet, wasp and bee stings, among males and females* – National Vital Statistics System, United States, 2000-2007.
<https://www.cdc.gov/mmwr/volumes/68/wr/mm6829a5.html>

Lundeberg, S. (2018, June 19) *Bees love blue fluorescent light and not just any wavelength will do.* <https://phys.org/news/2018-06-bees-blue-fluorescent-wavelength.html>

Sydney, N. V. and Goncalves, R. B. (2015). *Is the capture success of orchid bees (Hymenoptera, Apoidea) influenced by different baited trap designs? A case study from southern Brazil.*
<https://www.scielo.br/j/rbent/a/jdJrhJhyKzHfMgxYtgXRdRD/?format=html&lang=en>