

## Hong Kong Student Science Project Competition 2022

Template of Extended Abstract (Investigation)

(Word Limit: 1,000 words, Pages: 2 pages only)

**Team Number:** JBBC065

**Project Title:** The study of the feeding behaviour, food selection, and phototaxis of golden apple snail (*Pomacea canaliculata*)

**Project Type:** Investigation

**To our best knowledge and after thorough literature research, as at 26/6/2022 , are no\* similar works. If there are, the reference links are as below:**

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**The enhancement our project has made for the existing related products or research is summarized as below:**

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**\*Please delete if not applicable. HKSSPC values the originality of works. Students must conduct literature research thoroughly to ensure that their works are unique, and to list relevant reference materials to complement the research or invention.**

### I. Background

*Pomacea canaliculata* is an invasive species that causes great damage to both agriculture and the ecosystem. There have been different ways to reduce their impacts on the environment but most of the methods either cause harm to the environment. We hope to study the feeding behaviour, food selection, and phototaxis of *P. canaliculata* for further studies to control them.

#### **Phototaxis on *P. canaliculata***

Research on the effect of light on *P. canaliculata* had been done by Wagiman and Bunga (2006). The result showed that there were more snails on the mud surface at night than under daylight. Several experiments on the phototaxis of *P. canaliculata* had been performed by other secondary school students. However, the results were not clear as one found that they like light conditions but the other stated they like dark conditions.

#### **The biological clock of *P. canaliculata***

The *P. canaliculata* is found to be more active on dark nights by Wagiman and Bunga (2016). The result may not be strongly related to the time of the day.

#### **Food choice**

A research done by Cook and Bailey (2000) Showed that the food choice of slugs may be related to the nutrient content of the food. However, the injection of nutrients to slugs inhibited such preference in food.

#### **Food searching**

Stijn Ghesquiere (1997) stated that golden apple snails depend highly on their well-developed smell sense. On the other hand, the vision of the golden apple snail is rather weak as it merely acts as a light direction detector.

### II. Objectives

To understand how different factors of the environment affect the food choice and consumption amount of the snails in order for further investigation to develop more effective and eco-friendly methods to control them.

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### III. Hypothesis

Our hypothesis is that the calcium concentration and density of the snails can affect their food choice. Light conditions and time of the day may affect their consumption amount.

To investigate the above factors, we put the snails in different light conditions, times of the day, calcium conditions, and densities to observe their consumption pattern.

### IV. Methodology

Materials:

*Pomacea canaliculata* adult and juvenile, agar jelly, container.

Experiment design:

We put the snails in different light conditions and times of the day to observe their consumption amount and compared them. Also, we put the snails in different calcium conditions and densities and observe their consumption time.

### V. Results

After the experiments, we found out that the snails like dark conditions more than light conditions. However, light conditions might not affect the amount of vegetables they consume, while the time of the day and density of snails might affect their food choice and amount. The calcium content in water is a potential factor that affects their food choice, and it certainly affects their consumption amount.

Due to the covid-19 pandemic, some of the experiments are done at home and some at the school laboratory. As a result, some of the results cannot be recreated due to the difference in the environment and materials.

For the implications, we observed that the snails' consumption amount is also found to be low in high calcium conditions. Hence, increasing the calcium concentrations in the farmlands can help lower their impacts. However, further investigation must be done to investigate its effectiveness.

For further investigations, we needed further investigation to know the food consumption amounts if they live in high calcium concentrations for a long period of time.

### VI. Conclusion

We found out that light conditions might not affect their consumption amount, but time of the day might affect their consumption amount. Density of the snails might be a possible factor that affects their food preference. We know that they do not choose food at random. Lastly, it is reviewed that the snails consume less in high calcium concentration.

**Our project is developed based on our school's previous project and the enhancement is as below:**