



Gut content analysis of river snail, *Filopaludina martensi* in Mae Kha Canal, Chiang Mai: robust measures of diet composition



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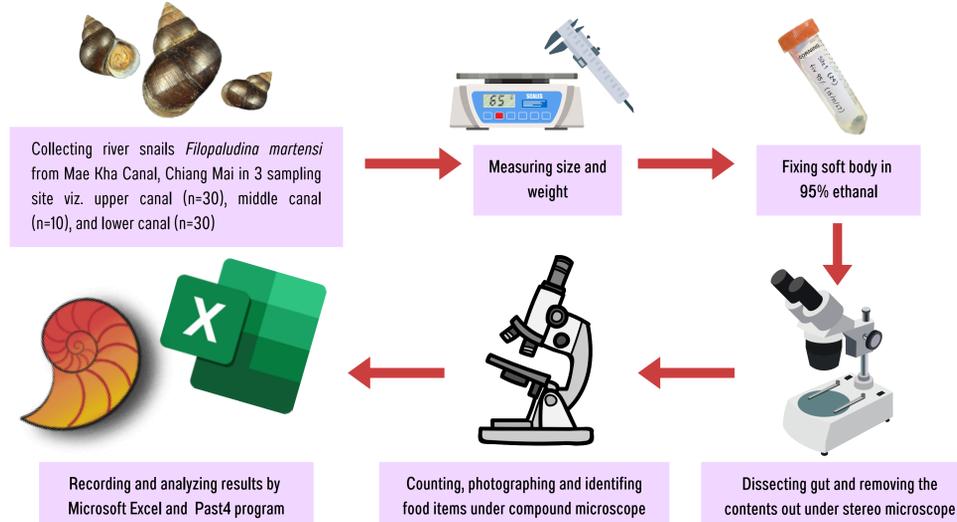
ABSTRACT

Filopaludina martensi is one of the most numerous commercial species consumed in Southeast Asian countries, including Thailand. It is the dominant freshwater species in Mae Kha Canal, Chiang Mai province, which has become a tourist attraction in Chiang Mai province recently. However, a diet of *F. martensi* in this area has never been done. The aims of this research are to study the composition of the main food in the digestive system of *F. martensi* in Mae Kha Canal, Chiang Mai and to study influence of habitat on quantity and diversity of food type through gut content techniques. The snail samples were collected by handpicking from November 2024 to December 2024 in Mae Kha Canal (upper, middle, and lower canal area). The results indicated that the relative contribution to the quantity and diversity of food types was different for each region: *F. martensi* in the upper canal area has the greatest number of quantities and diversity of food (40,217 individuals and 28 species of food types). The diagram results based on the Costello method revealed that river snails in the upper, middle and lower canals mainly consume *Chlorella vulgaris* and *Phormidium* sp., with differences in the third ($P < 0.05$). These results provided valuable insights into the feeding habits and ecological roles of the snail, which can help to improve our understanding of trophic interaction and freshwater ecosystems.

INTRODUCTION

Filopaludina martensi is an aquatic gastropod mollusk in the Viviparidae family. Snails live in a variety of natural freshwater environments, including ponds and rice fields. It is widely dispersed throughout Thailand and adjacent countries, including Laos, Cambodia, Myanmar, and Vietnam (Chuchoti, 1990). It is well known as a food source for locals, a vector of food-borne trematode diseases, a bio-indicator of heavy metal contamination, a bio-control agent, and a tool for reducing total organic matter content in feces and feed residual fish aquaculture (Hristov, 2022). The snail is also the dominant species in the Mae Kha canal. Mae Kha Canal is one of the most important features in Chiang Mai's water system, supplying local agriculture, irrigation, and transit. Unfortunately, due to rapid urbanization, the canal has suffered from huge levels of pollution, which has an impact on the biodiversity, including *F. martensi*. Furthermore, no previous research has been conducted on the feeding behavior of *F. martensi* in Mae Kha Canal, Chiang Mai, Thailand. Therefore, this study aims to investigate the composition of the main food in the digestive system of *F. martensi* in Mae Kha Canal, Chiang Mai and to study the influence of habitat on quantity and diversity of food types.

MATERIALS AND METHODS



CONCLUSIONS

Our findings indicate that *F. martensi* is a generalist species that mostly feeds on algae, cyanobacteria, Hydra, and diatoms. The other remains made up only a minor proportion of the stomach contents investigated. These research findings also suggested that the species had a high level of dietary flexibility. It was found that habitat determines the quantity and diversity of food consumed by river snails, with the upper canal, which serves as the river's source, having the most quantity and diversity. In deteriorated habitats, river snails may encounter food scarcity or consume poisonous compounds from poisonous foods, making survival more difficult. Furthermore, this study emphasizes the effects of water pollution on the health of aquatic species and ecosystems.

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REFERENCES

- [1] Chuchoti, C. 1990. การเลี้ยงหอยทาก. 1st ed. O.S. Printing House, Bangkok. 25 pp.
- [2] Hristov, K. K. 2022. A Note on *Filopaludina martensi* (Frauenfeld, 1865) Artificial Breeding Conditions. Jurnal Ilmiah Perikanan dan Kelautan, 14(1): 167-175.

RESULTS

A total of 70 specimens were collected and examined. The results revealed that *F. martensi* from the upper canal consumed the most quantity and variety of food. Conversely, the middle canal had the least amount and diversity of food (Figure 1-3). The trophic strategy diagram evinced a generalist diet of the river snails from upper canal with the highest consumption of *Chlorella vulgaris* followed by *Phormidium* sp. and *Hydra* sp. While, the middle canal had the highest consumption of *Chlorella vulgaris*, *Phormidium* sp. and *Oscillatoria* spp., and the lower canal with the highest consumption of *Chlorella vulgaris*, *Phormidium* sp. and *Nitzschia* sp., respectively. The Indicator species test results indicated that the relative contribution to the diet was similar for all basal resources (Figure 4-5).

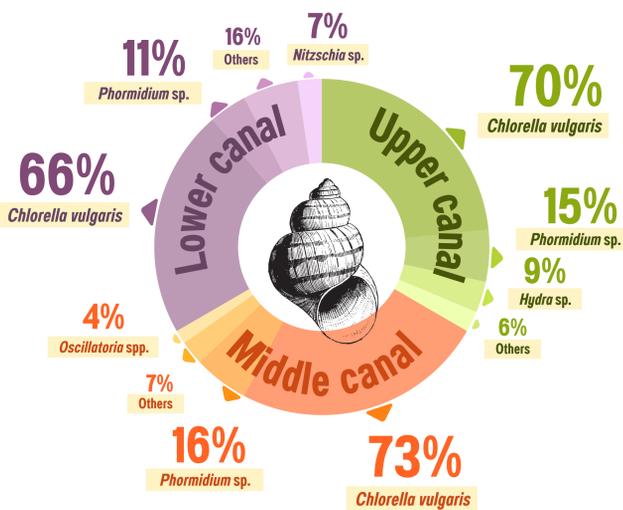


Figure 1 The diagram shows the relative abundance of *Filopaludina martensi*'s food type in each location.

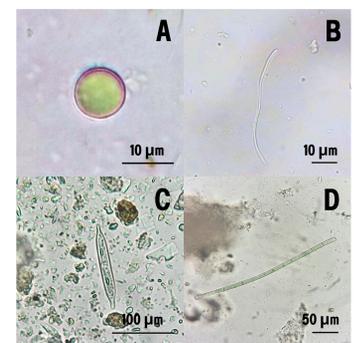


Figure 2 Main food types of the snail A) *Chlorella vulgaris*, B) *Phormidium* sp., C) *Nitzschia* sp., D) *Oscillatoria* spp.



Figure 3 The diagram of number of food type species that were found in each habitat.

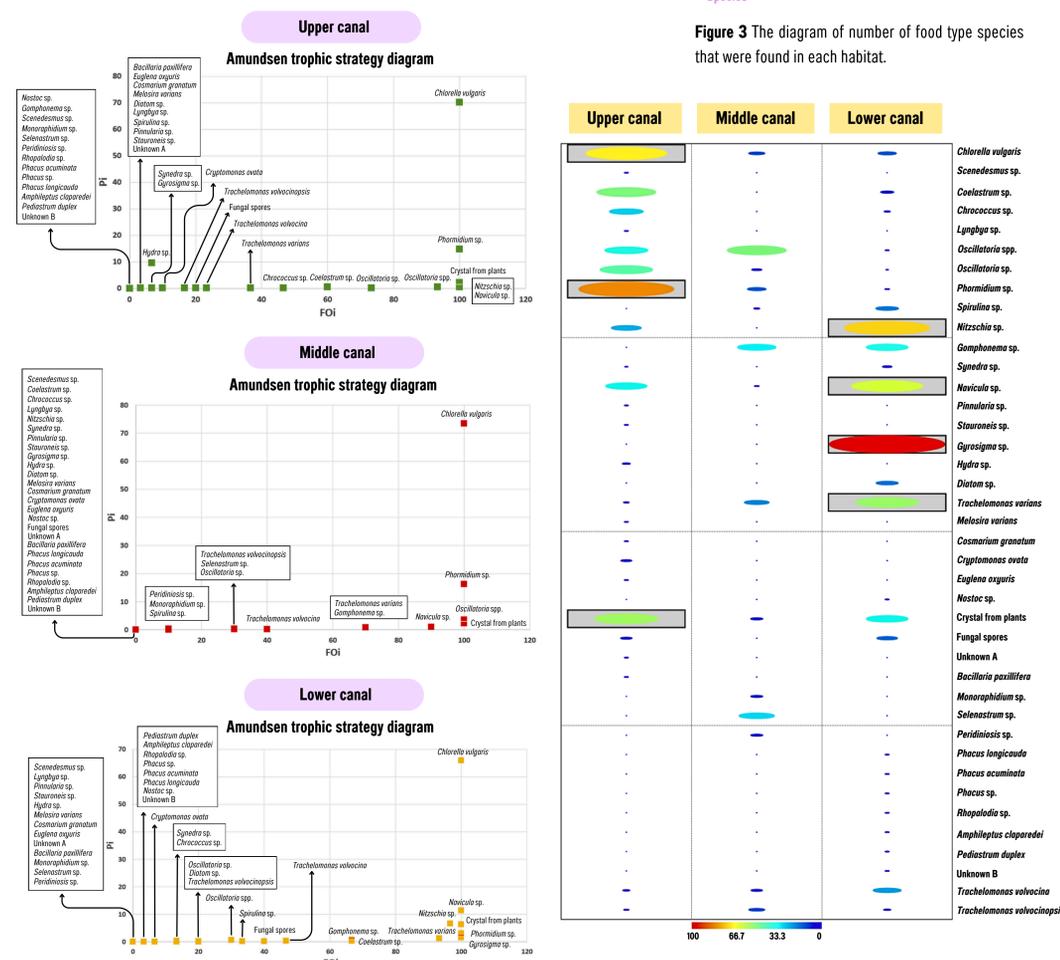


Figure 4 Amundsen trophic strategy diagram of river snails in each habitats. FO: Frequency of occurrence of the item i; P: Relative abundance of the prey i

Figure 5 Indicator species diagram showed abundance of food types in each location.