

# FEEDING BEHAVIOUR OF INVASIVE WHELK, *RAPANA VENOSA* VALENCIENNES, 1846 FROM THE SOUTH-EASTERN BLACK SEA, TURKEY

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## Abstract

In present study the effects of predator size, prey size, temperature and prey type on the time spent on feeding by *Rapana venosa* were studied in the laboratory conditions in the south eastern Black sea.

*Keywords: Black Sea, Alien species*

## Introduction

The Rapa whelk is not a native species of the Black Sea and introduced from Asian waters in the 1940's and it's first reported in Turkey waters in 1960s [1]. Rapa whelk, *Rapana venosa*, characterized by strong ecological fitness due to its high fecundity, generalist feeding strategy, early sexual maturity, longevity, fast growth rate and broad tolerance to salinity, temperatures, water pollution and oxygen deficiency (Figure 1). All these factors are characteristics of a successful invader. There are no major predators of invasive adult whelk in this region and an intensive predatory impact on the mussels by Rapa whelks [2].



Fig. 1. Rapa whelk morphology

Rapa whelks are the most important component of the demersal fauna in the coastal waters of south eastern Black Sea. Rapa whelks play an important role in the food web. The results of this study are a contribution to the understanding of the role of this species within the ecosystem.

The diel feeding periodicity, gastric emptying, food consumption [3] daily consumption rates, prey preferences [4, 5] were studied on feeding of Rapa whelk up to date. The present study aims to determine feeding behaviour of *R. venosa* based on the time spent on feeding in the Black Sea, Turkey.

## Material and Methods

Rapa whelk was collected using dredge on the South-eastern Black Sea at 20 m depth. Whelks were maintained in fiberglass tanks supplied with continuously flowing seawater. Adult whelks were placed in the aquaria, 30x30x30 cm, with water circulation and were fed mussel tissue or live mussels, *Mytilus galloprovincialis*. The ten experiments were conducted between July and October 1998. Feeding behaviour of whelks ranging from 61 to 89 mm in shell length was observed for 24 h for each experiment. In each experiment, each of the whelks was starved for 48 h and then presented a single meal of fresh mussel tissue (approximately 1 g). The total time spent on feeding from the start until the end of feeding on mussel tissue or live mussels was recorded for each individual. Effects of predator (Rapa whelk) size (71, 78 and 82 mm), prey size (0.97, 1.35 and 1.70 and 2.46 g), temperature (20, 23 and 26°C) and prey type (mussel tissue and living mussel) on the time spent feeding were studied.

## Results and Discussion

Rapa whelk was consumed mussels without damaging the shell of its prey in our study. The time spent on feeding by Rapa whelk decreased with increasing its size and increased with increasing prey (mussel tissue) ( $P < 0.05$ ). The time spent on feeding by predator *Rapana* varied with the temperature. Approximately 1 g mussel tissue was consumed in 70.6, 49.2 and 18.5 minutes at 20, 23, 26°C by adult whelks respectively. The Rapa whelk consume 14.3 g living mussel (2.42 g mussel tissue) in about 310 minutes while it consume 2.46 g mussel tissue in 160 minutes at 27-28°C. The estimated average food requirement for Rapa whelk was 1.2 (Northern Adriatic), 0.68 (South Western Atlantic) and 0.2-03 (South Eastern Black Sea) g mussel tissue per day [3, 4, 5]. These differences between studies may be due to different whelk size, temperature and prey types. The approximately 1 g mussel tissue used in our experiments is higher than daily food requirement for *Rapana*.

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