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Beberapa predator ubur-ubur (*Rhopilema nomadica*) yang memasuki Teluk Antalya

Some predators of the jellyfish (*Rhopilema nomadica*) entering the Gulf of Antalya

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Abstrak

Rhopilema nomadica, yang diperkenalkan ke ekosistem Mediterania belakangan ini, adalah spesies ubur-ubur yang berasal dari Samudra Hindia. Ubur-ubur ini tersebar di sepanjang pesisir Pakistan, Mozambik, dan Laut Merah. *R. nomadica*, yang sangat melimpah di Israel, Lebanon, Suriah, dan Teluk Iskenderun, hanyut ke arah barat dari perairan terbuka Teluk Antalya antara bulan Maret hingga Mei mengikuti arus utama Laut Mediterania. Sebagian dari ubur-ubur ini memasuki Teluk Antalya dan menimbulkan rasa takut serta kecemasan bagi para perenang di laut. Selama penyelaman scuba kami ke tebing-tebing terkenal dunia di Antalya, diamati bahwa cacing api berjanggut (*Hermodice carunculata*) berkumpul di atas ubur-ubur yang berada di dasar laut, menghambat kemampuan mereka untuk berenang dengan menciptakan beban dan mengonsumsinya sebagai makanan. Selain itu, dalam lingkup studi ini juga ditemukan bahwa beberapa ubur-ubur di dasar laut dikonsumsi oleh kepiting (*Charybdis hellerii*). Dokumentasi berupa foto dan rekaman video mengenai interaksi makhluk hidup ini telah diambil. Dalam studi ini, disajikan interaksi antara ubur-ubur dan predatornya.

Kata kunci: Charybdis helleri; Hermodice carunculate; Rhopilema nomadica; Teluk Antalya

Abstrak

Rhopilema nomadica, which was introduced to the Mediterranean ecosystem later, is a jellyfish species originating from the Indian Ocean. This jellyfish is distributed along the coasts of Pakistan, Mozambique and the Red Sea. *R. nomadica*, which is very abundant in Israel, Lebanon, Syria and the Gulf of Iskenderun, drifts westward from the open waters of the Gulf of Antalya between March and May with the main currents of the Mediterranean Some of these jellyfish enter the Gulf of Antalya and cause fear and anxiety for swimmers in the sea. During our Scuba dives to the world-famous cliffs of Antalya, it was observed that Bearded fire worm (*Hermodice carunculata*) gathered on the jellyfish at the bottom, preventing them from swimming by creating weight and consuming them as food. Again, within the scope of this study, it was determined that some jellyfish at the bottom were consumed by crabs (Charybdis hellerii). Photographs and video recordings of the interactions of these living creatures were taken. In this study, the interaction between jellyfish and their predators is presented.

Keywords: Charybdis helleri; Gulf of Antalya; Hermodice carunculate; Rhopilema nomadica

1. Introduction

Rhopilema nomadica, which was later included in the Mediterranean ecosystem, is a jellyfish species originating from the Indian Ocean. This jellyfish is distributed in the coasts of Pakistan, Mozambique and the Red Sea (Berggren, 1994; Tahera and Kazmi, 2015; Zeidler et al. 2018). This jellyfish, which was first seen in the Mediterranean off the coast of Israel in the mid-1970s (Galil et al. 1990; Lotan et al. 1992), has started to cause harm to fisheries, tourism, the environment and human health by forming large swarms off the coast of Israel since the early 1980s. It is also reported that this jellyfish causes economic losses by blocking sea water intake units for cooling power plants in Israel (Zeidler et al. 2018). Again, jellyfish thrown onto the shores by the waves accumulate on the sea shores and create visual pollution (Spainer and Zviely 2023).

The presence of R. nomadica in the Mediterranean is not limited to the coast of Israel. This jellyfish has expanded its distribution due to the current system and prevailing winds and has begun to be seen on the coasts of Egypt, Palestine, Lebanon, Syria and Turkey (Yahia et al.,2013).

The first record of *R. nomadica* on the Turkish coast was made by Bingel (1984), also from the eastern Mediterranean region. This jellyfish has expanded its distribution in the Mediterranean west to Italy (Balistreri and Ghelia 2015; Crocetta et al. 2015; Balistreri et al. 2017).

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Jellyfish constitute one of the important links of the food chain. For this reason, it constitutes the food of some marine organisms (Hays et al., 2018). Food consumers include some fish species, seabirds, sea turtles, marine mammals, crustaceans and gastropod species. Despite their low energy content, jellyfish have an increased digestion rate due to their high water content (Arai et al., 2003). It can support a range of nutritional needs by providing alternative benefits such as increased capture efficiency due to slow swimming speeds and abundant availability behaviors (Hays et al., 2018).

R. nomadica, which is very abundant on the coasts of Israel, Lebanon, Syria and the Gulf of Iskenderun, drifts westward from the coast of Gulf of Antalya with the main currents of the Mediterranean between March and May. Some of these jellyfish enter the Gulf of Antalya and cause concerns for human health.

During our Scuba dives to the world-famous cliffs of Antalya during this transition period, it was observed that sea centipedes (*Hermodice carunculata*) gathered on the jellyfish at the bottom, preventing them from swimming by creating weight and consuming the jellyfish as food. Also within the scope of this study, it was determined that *Charybdis hellerii*, an exotic crab species, consumed some jellyfish at the bottom. Consuming jellyfish by other creatures on the coast of Antalya, a tourism center, is considered positive as it reduces the risks in terms of tourism.

2. Material and Method

This study was carried out between 03 - 16.04.2022 dates by Scuba diving in the area from Antalya Kaleiçi Yacht Harbor to the beginning of Konyaaltı Beach Cliff in Antalya. In the study, scuba dives were made between 3-25 m depths with rocky bottom structure. In the research, Canon G12 camera and housing were used to take photos and videos of jellyfish. During our study, jellyfish density was determined visually in the coastal area.

3. Results and Discussions

3.1. Results

Drifted by currents, *R. nomadica* passes off the coast Gulf of Antalya periodically every year in spring. During this transition in the spring months, jellyfish that reach a certain density in Gulf of Antalya are seen to wash up on the shores from time to time (Figure 1). During this study, a very dense jellyfish migration (1 individual/20 m^2) was observed.



Figure 1. Individuals of *R. nomadica* at the mouth of the Serik/Boğazkent Köprüçayı river in spring (2022) (left side). The picture on the right shows a large number of jellyfish caught in a fishing net.

During our scuba dives to the Antalya Cliffs in April (2022), it was noted that some *R. nomadica* individuals were morphologically damaged. In our examinations of these jellyfish, which lost their normal swimming abilities, setae belonging to the sea centipede (*Hermodice carunculata*) were observed. It has been determined that these polychaetes are concentrated on jellyfish found at the bottom of rocky areas and that they feed on jellyfish. These jellyfish, which are attacked by polychaetes, constantly stay at the bottom due to their increase in mass and are consumed as food. In our observations, a similar situation was observed for all jellyfish found at the bottom of rocky areas (under cliffs). During the studies, photographs and videos of some of these jellyfish were taken (Figures 2 and 3). It was also observed that crabs (*C. hellerii*) were feeding on some jellyfish found at the bottom (Figure 4).

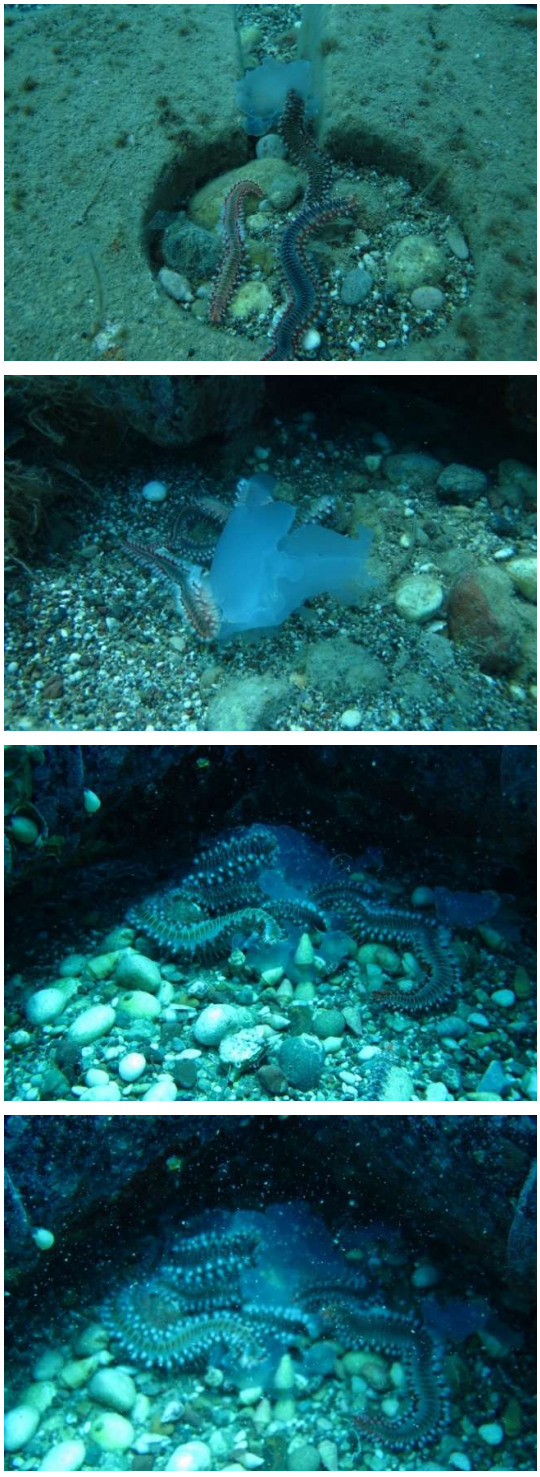


Figure 2. *H. carunculata* feeding on *R. nomadica* under Antalya Cliffs.

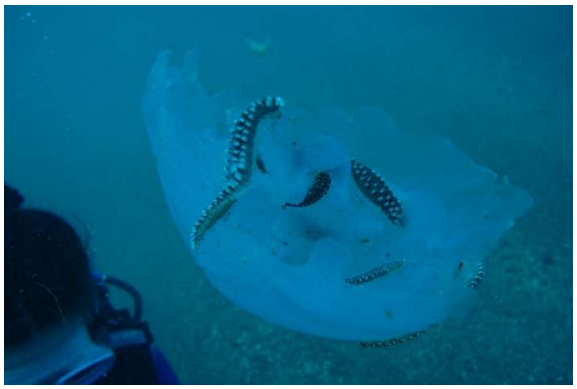


Figure 3. *R. nomadica* and feeding *H. carunculata* in a gravel area of Konyaaltı beach.



Figure 4. Crabs (*C. hellerii*) feeding on jellyfish in the rocky area at the beginning of Konyaaltı beach

In the spring months, when the weather begins to warm up in Antalya, some people come into contact with the *R. nomadica* species while swimming in the sea. Since jellyfish contact and injuries mostly occur in areas where tourism is intense, complaints are made to tourism professionals from time to time. In the face of this situation, tourism professionals ask for advice from our faculty for solutions and measures.

3.2. Discussıon

Rhopilema nomadica is one of the jellyfish that migrate to the Mediterranean. This jellyfish proliferates in the eastern Mediterranean and is frequently seen along the coasts of Egypt, Israel, Lebanon and Syria. It is also stated in press releases that it negatively affects our fisheries by concentrating from time to time in the Iskenderun Gulf along the Turkish coast (Aktuğ, 2022). These jellyfish drift westward with the currents along the Mediterranean coast of Turkey and reach the coasts of Greece, Italy and even Tunisia (Yahia et al., 2013).

The overgrowth of *R. nomadica* in the Mediterranean can be attributed to global warming, pollution loads, eutrophication and overfishing, and increasing water temperature. In the Mediterranean, these effects are most intense in the eastern Mediterranean, called the Levant sea (Zeidler et al. 2018). The jellyfish that proliferate in this region are carried westwards by the effect of current and wind. This situation negatively affects sea swimmers, fishermen and tourism professionals. There is also concern among the public about some cases reported to the press. The consumption and oppression of these jellyfish by other creatures is considered a positive situation.

There are many organisms that feed on jellyfish in marine environments, from fish to mammals (Hays et al., 2018). Crabs are also among these organisms. *H. carunculata* is a polychaete species that generally feeds on the bottom and as a scavenger. Due to their scavenging behavior, they are commonly referred to as the scavengers of the Mediterranean Sea. Research on *H. carunculata* has indicated that these creatures feed on jellyfish of the Cassiopea genus (Stoner and Layman, 2015). Our study revealed that *R. nomadica*, a Red Sea species in the Mediterranean, also preys on these jellyfish, which has not been previously documented in the literature.

4. Conclusion

As a result, the risk-free bay is very important for Antalya, which is known as the capital of tourism. It is crucial to reduce or eliminate potential risks in this manner. These creatures have played a significant role in the food chain by helping to mitigate the adverse effects of *R. nomadica* on fisheries, tourism, the environment, human health, and power plants.

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