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The Dietary Habits of Patella rustica in Eastern Libya

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العادات الغذائية للرخوي البحري *Patella rustica* في شرق ليبيا

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Abstract:
In this research, we explore the feeding habits of the patelid limpet (Patellar Rustica) in the city of Soussa. After surveying and examining its stomach contents, we found that green and red algae were its primary food source, and that diatoms were also consumed, along with a very microbial biofilm. One of the most significant observations is that this patelid limpet was remarkably selective in its food choices; no sand or other impurities were found in its stomach, indicating the use of radula. It was also noted that the type of food varied somewhat according to the patelid limpet size and the season.

Keywords: Patella rustica, feeding ecology, stomach contents, intertidal zone, Libya, algae.

الملخص:
في هذا البحث، نستكشف العادات الغذائية لحيوان البطلينوس (Patella rustica) في مدينة سوسة .بعد مسح وفحص محتويات معدته، وجدنا أن الطحالب الخضراء والحمراء كانت مصدر غذائه الرئيسي، كما تم استهلاك الدياتومات (Diatoms)جنباً إلى جنب مع غشاء حيوي ميكروبي .(Biofilm) ومن أبرز الملاحظات أن هذا الحيوان كان انتقائياً بشكل ملحوظ في اختياراته الغذائية؛ حيث لم يتم العثور على رمال أو شوائب أخرى في معدته، مما يشير إلى كفاءة استخدام" المكشطة .(Radula) "كما لوحظ أن نوع الغذاء يتغير نوعاً ما تبعاً لحجم الحيوان وفصول السنة.

لكلمات المفتاحية: الرخوي البحري، إيكولوجيا التغذية، محتويات المعدة، المنطقة المدية، ليبيا، الطحالب.

Introduction:

Living on rocks facing the sea is no easy feat; creatures there endure the slaking of waves, temperature fluctuations, and the difficulty of finding food. The patella rustica is one of the most well-known creatures that has successfully adapted to this challenging environment along the Mediterranean coast [1].

This animal not only clings to the rocks but also plays a vital role in cleaning them of excess algae [2]. It uses a very rough radula called a radula to scrape algae and diatoms from the rock surfaces [3]. Given that our coasts in Libya, particularly the Soussa region, are exceptionally rich in biodiversity, as noted by Dr. Suliman in his book [4], I decided to conduct this study to determine exactly what these snails eat and how they adapt to our local environment The *Patella rustica* is one of the most well-known creatures that has successfully adapted to this challenging environment along the Mediterranean coast [1,5].

Methods:

I chose the port area of Soussa because its rocky terrain intertidal rocky habitat with the sea, making it an ideal location for collecting specimens.

I randomly collected 120 specimens between February and October 2024. I was very careful when using steel spatulas to avoid damaging the delicate bodies of the animals inside their shells. Afterward, I classified them and began taking measurements:

Measurements:

I used a digital analytical balance and a micrometer to accurately measure the length of the shell and the weight of the animals.

Statistical analysis was performed using spss.one –way ANOVA was applied to test the significance of seasonal variations in diet composition ($p<0.05$).

Examination of the stomach:

To determine its fullness, I followed Pillay's criteria [6] To identify the contents, I used a dissecting microscope to point-count methodand identify the types of algae and diatoms present in each stomach [7]. The dietary importance of each item was determined following the methods described by [8].

Results:

Morphometric analysis of *Patella rustic*a specimens revealed variations in dimensions and weights, with the minimum shell length recorded at 14 mm and the maximum at 38 mm. Individual weights ranged from 0.5 to 14 grams. Calculating the central values showed an average length of 26 mm and an average weight of 6.9 grams for the entire representative sample.

Table (1): Morphometric Characteristics of *patella rustica*:

parameter	Minimum	Maximum	Mean
Shell length (mm)	14	38	26
Total weight(g)	5.0	14	6.9

Description of Gastrointestinal Fullness:

Based on the established scale (0-100%), field data from Soussa showed that feeding peaks in summer, while fullness gradually decreases in spring and autumn, reaching its lowest point in winter. This study observed a close relationship between shell size and the amount of food in the stomach; the larger the *patella rustica,* the greater its stomach fullness.

Food abundance in the stomach of patella rustica:

Nutritional Composition Description: Stomach analysis of *Patella rustica* revealed that algae (green and red) topped the list of consumed elements, followed by diatoms, with biofilm ranking last. This hierarchy of components confirms the nature of nutrition in rocky areas, where microalgae represent the primary source from which *Patella rustica* derives its energy.

Table (2): Composition and ranking of food Items in the Stomach of *patella rustica*

Food Item	Composition%	Frequency Of Occurrence%
Macroalgae (Green & Red)	**65%**	**90%**
Diatoms	**25%**	**75%**
Biofilm	**10%**	**40%**
Total	**100%**	**-**

Seasonal Nutrient Abundance in The Stomach of patella rustica*:*

Analyses showed the dominance of green algae as a nutrient source throughout the year. Red algae peaked in summer and then gradually declined during spring and autumn, reaching their lowest levels in winter. Diatoms, biofilm, and seaweed exhibited a similar seasonal pattern, with peak abundance in summer, followed by spring and autumn, and lowest levels recorded during winter.

Table (3): seasonal relative abundance (%) of food item in the stomach of *patella rustica*

Food Item	%Summer	%Spring	Autumn	Winter
Green algae	60%	55%	51%	47%
Red algae	12%	9%	8%	5%
diatoms	10%	8%	6%	5%
biofilm	9%	8%	4%	2%
seaweed	9%	7%	5%	3%
total	100%	87%	74%	62%

Statistical testingindicated significant seasonal shifts in the consumption of green algae and diatoms ($f=4.12$, $p=0.018$), with summer showin the highest feeding activity.

Dietary shifts across different size classes of patella rustica:

- Young individuals focus their diet on algae (green and red) and diatoms.
- Medium-sized individuals have increased their consumption of diatoms and biofilm, with a noticeable increase in seaweed.
- Large individuals have decreased their consumption of red algae while relying more heavily on green algae, diatoms, and biofilm.

Table (4): percentage of food items by shell length in *patella rustica*

Shell Length (Mm)	Green Algae (%)	Red Algae (%)	Diatoms (%)	Biofilm (%)	Seaweed (%)
(>15) Small	45%	%35	%15	3%	2%
Medium (15-25)	30%	%15	25%	%15	15%
(<25) Large	50%	5%	25%	%15	5%

Discussion:

From what I observed, I can say that *Patella rustica* in Soussa is a specialized grazer. The absence of sand in its stomach confirms that its abrasive tongue functions with exceptional precision, capturing only food. This was also confirmed by researchers [2] and more recently by [9] who linked radular morphology to feeding efficiency.

It was also noted that green and red algae are its preferred food source, which is typical in an intertidal environment [10]. What struck me was that the larger the snail, the greater its ability to diversify its diet and eat harder materials like seaweed. This aligns with [11] observation that size gives the animal greater competitive advantage in food. Increased feeding in the summer is quite logical, as algae grow faster in the sun and heat [12] a pattern consistently observed in recent Mediterranean studies [5]

Conclusion:

In short, this shell plays a vital role in maintaining the cleanliness and balance of our rocky beaches. Its ability to adapt its diet to its size and the season makes it very successful in thriving along the coast of Soussa. Further studies are recommended on the Libyan coastline so we can learn more about the secrets of these creatures.

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