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## Spatial Distribution of Norway Lobster *Nephrops norvegicus* (Linnaeus, 1758) Caught in Bouzedjar Bay and Associated Benthic Fauna

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### Abstract

Surveys were conducted in the field, near the port of Bouzedjar with fishermen, to acquire a knowledge of the spatial and depth distribution of the Norway lobster *Nephrops norvegicus* (Linnaeus, 1758). To complete our investigations, we referred to the informations obtained during the Spanish trawling and acoustic survey which was carried out on the Algerian coast in 2004 aboard the Spanish research vessel R / V Vizconde de Eza. Analysis of the results reveals that the rich funds in Norway lobster were located in the central area of the continental shelf between the immersions 250 and 400 m. It is thus observed very clearly that fish caught on these funds are mostly represented by Gadidae family; the most common species is the Greater forkbeard *Phycis blennoides* (Brünnich, 1768) (12.30%) followed by *L. budegassa* (10.86%) and *P. bograveo* (6.27%). Elasmobranchs were very few except the small dogfish, *Scyliorhinus canicula* (L., 1758) (6.15%) which is quite common.

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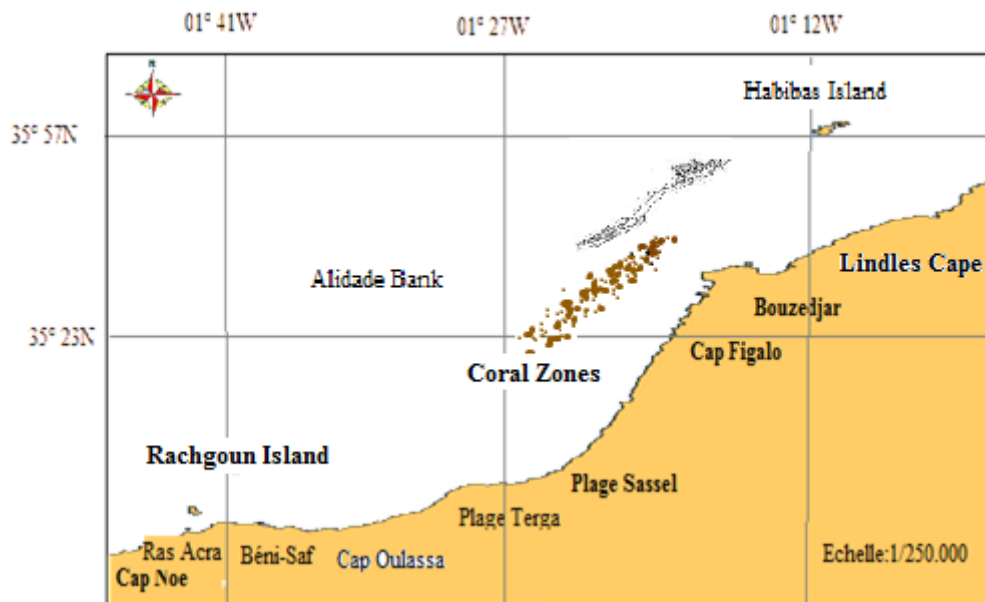
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Two Crustaceans mainly represented invertebrates that appear in this survey, in association: *Palinurus elephas* (23.16%) and *Parapaneus longirostris* (12.18%). Finally, there was a proportion of discarded fish that was very significant and consisted of small specimens that didn't reach the commercial length mainly represented by dogfish *Scyliorhinus canicula* (L., 1758).

**Keywords:** Spatial distribution; depth; fisheries; Norway lobster; Associated fauna; Bouzedjar Bay; Algeria; Western Mediterranean

## 1. Introduction

Aïn Témouchent province is situated between latitudes 35° 20' N and 35° 40' N and from longitude 2° 00' West to 2° 30' East, occupies over 5000 km<sup>2</sup>. It extends over a length of 80 km from Cape Falcon in the east to Ras Honaine (cap Noé) (Figure 1). It's marine biomass was evaluated at 60 000 tones (ISTPM, 1982). Two main ports are noted hosting more than 452 trawlers divided between Beni Saf (256) and Bouzedjar (185) fisheries.



**Figure 1:** Localization of the study area.

The observations of the research vessel "Thalassa", during its campaign in 1982 in the Algerian continental shelf state that Ghazaouet fishing zone in Bouzedjar, has one of the largest continental shelf in our coasts [1,2].

Among the crustaceans caught in Bouzedjar Bay the Norway lobster *Nephrops norvegicus* (Linnaeus, 1758) frequenting depths comprised between 267-863 m. The highest densities were observed between 280-400 meters near coral areas (figure 1) ([3,4,5]).

Market demand for Norway lobster has increased significantly this recent years, with an average selling price around 35 €/ Kg. Aware of the high economic value represented by this decapod species professionals in this

sector have accentuated their fishing efforts with a current production near 27.530 tons per year [6].



**Figure 2:** General aspect of *N. norvegicus* (Linneaus, 1758).

## 2. Material and methods

A total of 21 fishing trips (Fig. 3), as well as investigations were carried out on with fishermen from Bouzedjar port, to acquire knowledge of the spatial distribution and bathymetry of the species.



**Figure 3a:** On board of a trawler (Syphax) on the arrival of the trawl.

For each sea trip, the boats moved towards well-known fishing areas and sometimes to other non-prospected ones. The information obtained was used as a basis to establish a map showing fishing areas for Norway lobster of Bouzedjar Bay. To complete our investigations, we referred to the information obtained during the Spanish trawling and acoustic survey which was carried out on Algerian coast in 2004 aboard the Spanish research vessel “**R/V Vizconde de Eza**”.

Additional information on the distribution of the species is the study of associated fauna, allows us to complete our knowledge of the ecology of the lobster and also to inventory, the specific composition of the different associated species.

The associated fauna is very diverse. First, we have considered only the species that live in the same habitat. Secondly, to highlight the most characteristic species, we defined criterion: relative abundance, corresponding to the percentage of individuals of a fish species considered to the total number of individuals captured, except for individuals of the targeted species.

$$A_R = (n/N) \times 100.$$

n: number of individuals of each species associated.

N: total number of individuals of all species.

We highlight that we took into consideration only those species that present a relative frequency greater than 0.05%. Also for every fishing trip, we note the common name of the species as well as the weight of the total catch. Thereafter, we established taxonomy of each species caught during the landing of sea products.

### 3. Results

It appears from our investigation that the fishing zones of *N. norvegicus* in the bay Bouzedjar extend from the Borj Bouabed Cape to Lindles Cape (Figure 1). Also we can add that areas of distributions and high biomass (Figure 3b) of this decapod are at aggregated near coral zones, bathymetric limits are presented in Table 1.

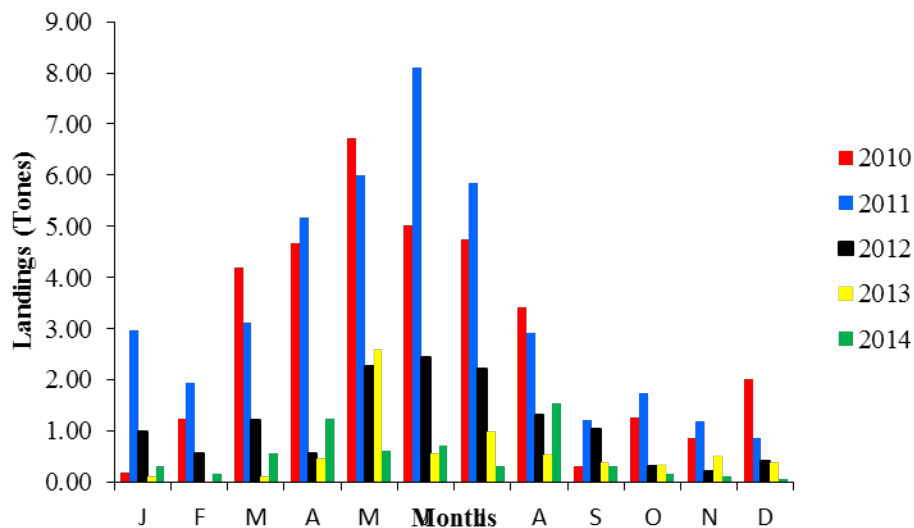


Figure 3b: Monthly landings of Norway lobster *N. norvegicus* caught in Bouzedjar Bay (Algeria)

Table 1: Data on fishing area frequented by *N. norvegicus* obtained during the study.

Fishing area	Latitude	Longitude	Minimal depth (m)	Maximal depth (m)
A1	35° 41' 000'' N	01° 21' 600'' W	336	357
A2	35° 41' 565'' N	01° 21' 770'' W	362	383
A3	35° 41' 000'' N	01° 22' 560'' W	430	455
A4	35° 47' 107'' N	01° 15' 967'' W	330	463

During the landing, we have listed different families: Gadidae, Elasmobranchs, invertebrates (crustaceans and cephalopods) (Figure 4) which has the same depth distribution. We have subsequently plotted the percentage of fish and crustaceans species (Figure 5) associated to our species.



Figure 4: Associated fauna to Norway lobster caught in Bouzedjar Bay.

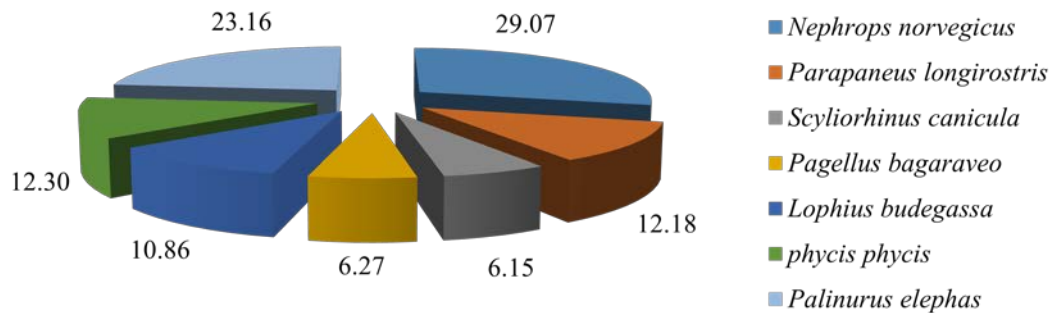


Figure 5: Frequency of associated fauna with Norway lobster *N. norvegicus* (Linnaeus, 1758).

#### 4. Discussion and conclusions

*Nephrops norvegicus* (L. 1758) (Decapoda: Nephropidae) is a species with a wide geographical distribution from the Atlantic coast of north-west to the east of the Mediterranean [7]. The Norway lobster fishing on the Algerian west coast was only initiated in recent years. According to [8], the fishing grounds of this species remained undeveloped until the end of the last century because of their distance from ports and fishing activity

strongly influenced by hazardous weather conditions, and lack of appropriate equipment (insufficient cables length, old board equipment, unskilled crew, delapidation of the fishing fleet, ...).

Trawling in the study area was focused on the white shrimp *Parapenaeus longirostris* (Lucas, 1846). The fishing zones that were identified show that vessels operate from Habibas islands to banc d'alidade a coral bottom area where norway lobster is abundant. Our results show a clear development of the fishing for *Nephrops norvegicus* (Linnaeus, 1758) performed at depths varying from 180 to 550 m.

Reference [8] affirmed that, the fishing grounds of this crustacean in Algeria, are distributed at depths of around 400 m, while in other regions of the Mediterranean, fishing depths for norway lobster oscillate between 200 and 750 m [9,10,11,12,13].

The analysis of our results shows that the richest areas in norway lobster are mainly located in the central region of the continental shelf, between 250 and 400 meters. We can also affirm that fish caught on these funds are mostly represented by Gadidae family; the most common species is *Phycis blennoides* (Brünnich, 1768) (12.30%) followed by *Lophius budegassa* (10.86%) and *Pagellus bogarveo* (6.27%). Elasmobranchs are very few except the small dogfish, *Scyliorhinus canicula* (L., 1758), which is rather frequent (6.15%)

Invertebrates are widely represented by two species: the spiny lobster *Palinurus elephas* (Fabricius, 1787) (23.16%) and the white shrimp, *Parapenaeus longirostris* (Lucas, 1846) (12.18%). Finally, there is discarded fish that was very significant and consisted of small dogfish *Scyliorhinus canicula* (L., 1758) that didn't reach a comercial length. The analogy of this associated fauna of the continental shelf of Bouzedjar Bay with that of the Adriatic in the Mediterranean, and the great mudflat in European Atlantic is remarkable and have been already reported by [14].

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