Distribution of the beach Arthropods at north-eastern Moroccan coast

Medcore International Conference

« From watershed to the sea : Interactions and changes »

Firenze, 10-14 November 2005

Beach ecosystems are considered stressful habitats for most organisms, due to fluctuating physico-chemical factors as humidity, temperature, salinity…

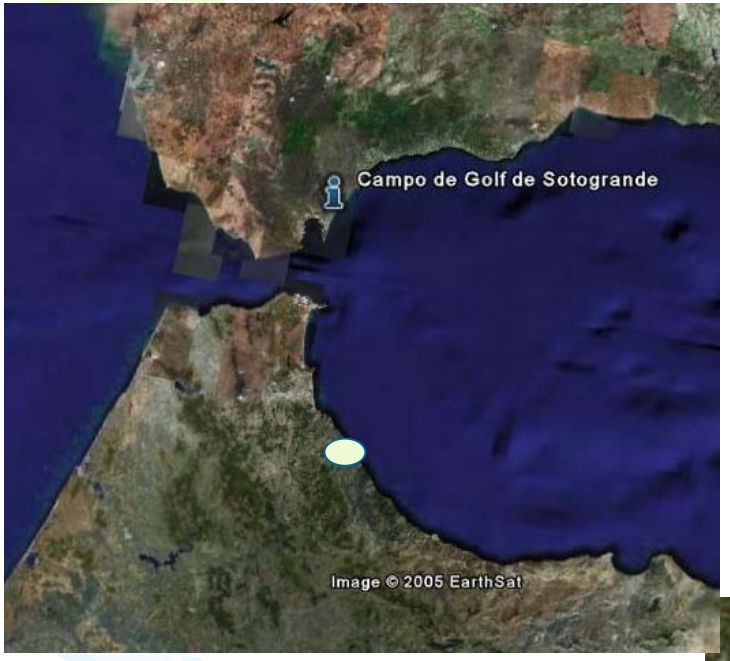
Only a restricted number of species are adapted to cope with these continuous fluctuations

Behavioural mechanisms are adopted by the different species of Arthropods living in an unstable environment

Aims

- Study the community structure of the most common arthropods inhabiting the beach
- Analyse the surface activity and the spatial distribution of the different species and within each species according to sex and age
- Compare of the diversity and the zonation of the Crustaceans inhabiting the Moroccan site (Aouchtane) and the Tunisian One (Barkoukech)

Geographical position of the study site



GPS N 35 30 450

W 05 09 351

Geomorphological Aspects

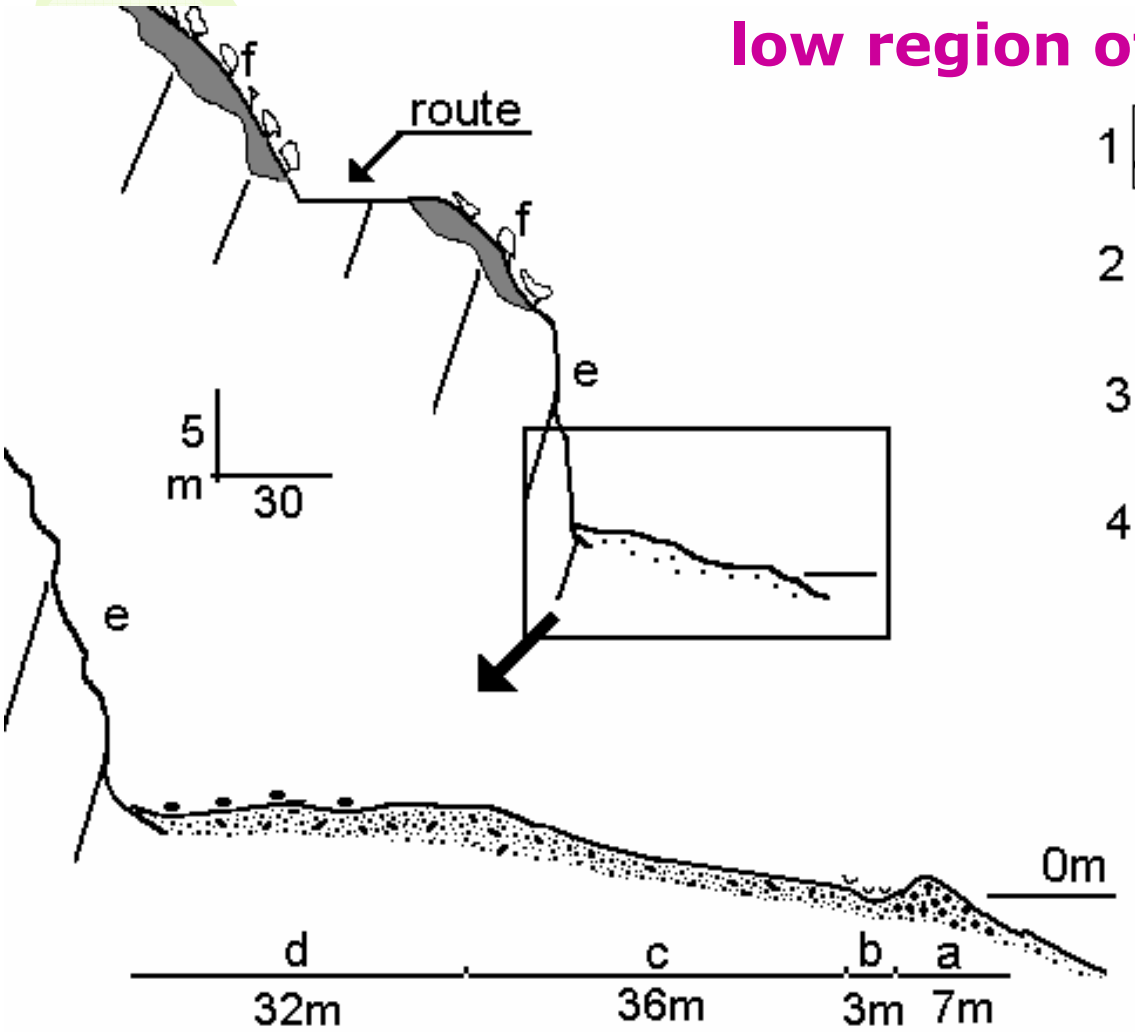
occupied a bottom of a creek and show from the sea to the inland, a beach, a cliff and a mountainside covered by degrade natural vegetation

Moroccan study site

shared a similar geomorphological landscape with Barkoukech site

Tunisian study site ⟶

Transect across the beach and the low region of the coastal



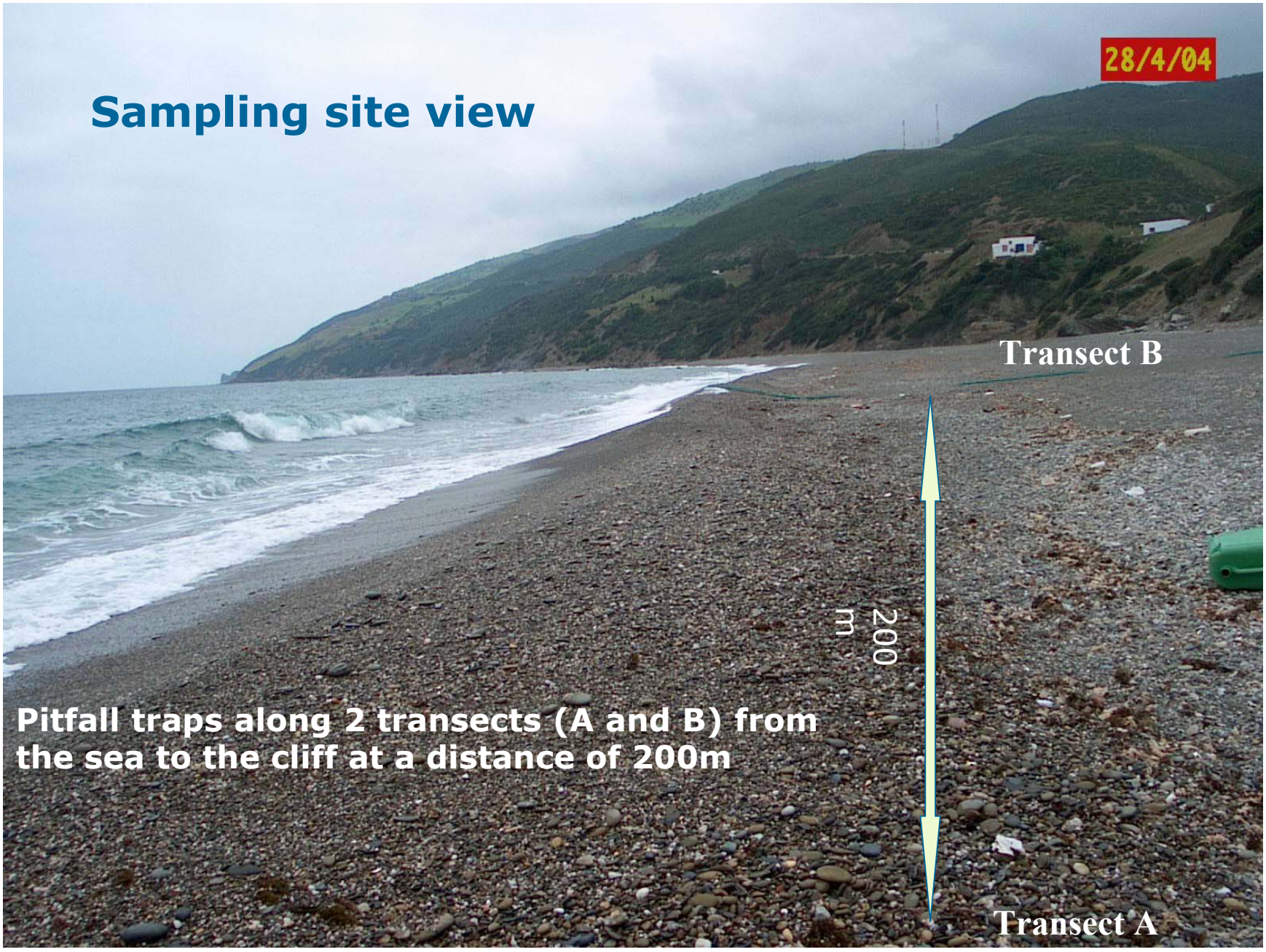
1 Substratum paléozoïque

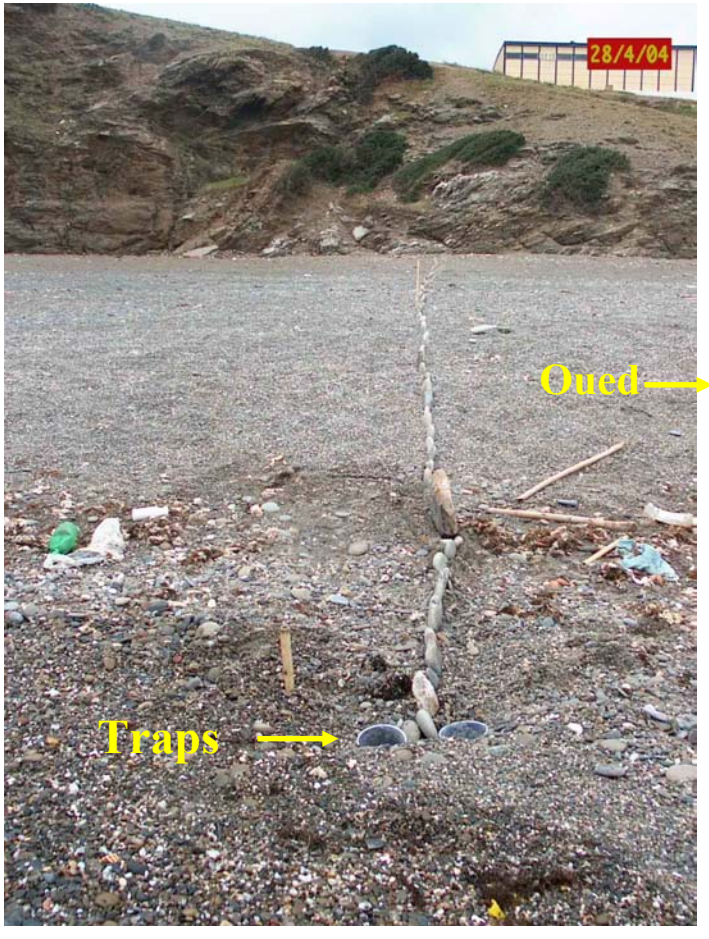
2 Colluvions et éboulis quaternaires

3 Végétation naturelle

4 Plage

a-frange externe du bas de plage ; b- bâche ou petite gouttière ; c- bas de plage ; d-haut de plage ; e-falaise ; f- versant côtier couvert **(D'après A. Oueslati)**


28/4/04
Sampling site view
Transect B
200 m
Pitfall traps along 2 transects (A and B) from the sea to the cliff at a distance of 200m
Transect A



Pair traps were placed along the transects and separate traps in the coastal mountainside

Field Sampling

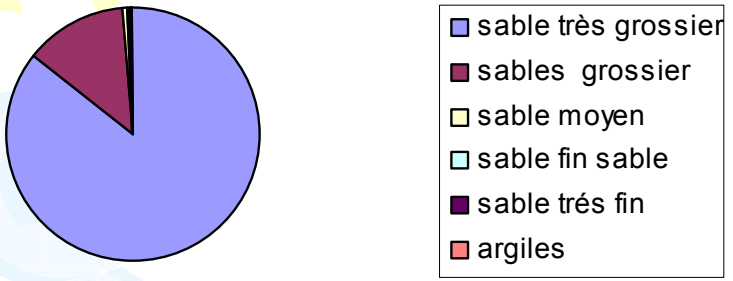
- Field study was carried out near O. Aouchtane during 48 hours (28-30 April 2004)
- Specimens of each trap were kept each 24 h and conserved in alcohol
- Sand samples were taken in each transect from high, medium and low eulittoral for laboratory analysis

Laboratory Analysis

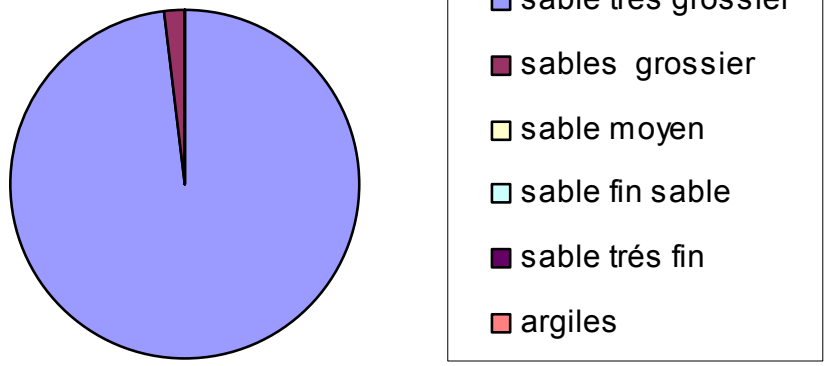
- For each trap, species were separated on the basis of their specific morphological features
- Abundant arhropods were separated on juveniles (non sexually differentiated) and adults
- Adults of each species were sorted on males and females
- Sand samples were sieved with meshes of different size

Granulometric Analysis

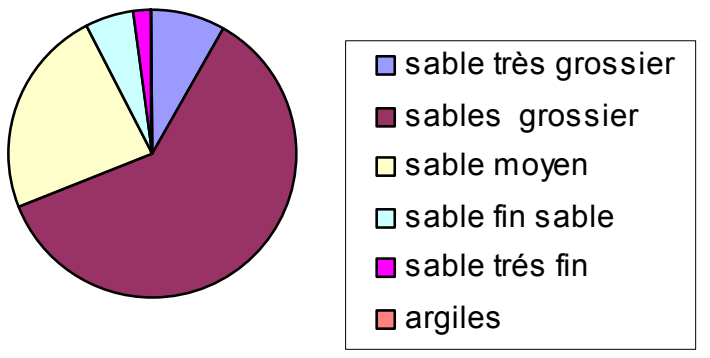
Sediment fractions in the Low Eulittoral (transect A, 2)



Sediment fractions in the Medium Eulittoral (transect A 3, 4)



Sediment fractions in the High Eulittoral (transect A)



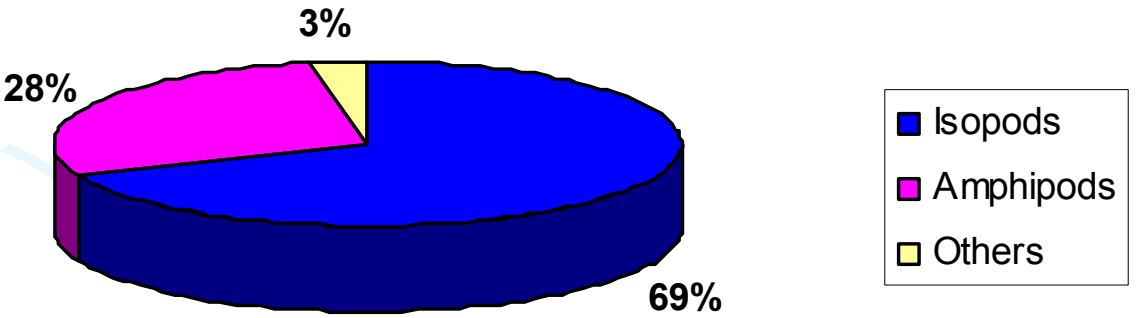
(D'après N. Halouani)

Arthropod Macrofauna : Frequency of capture

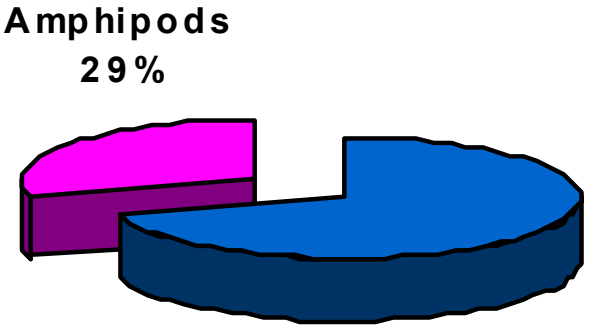
Phaleria

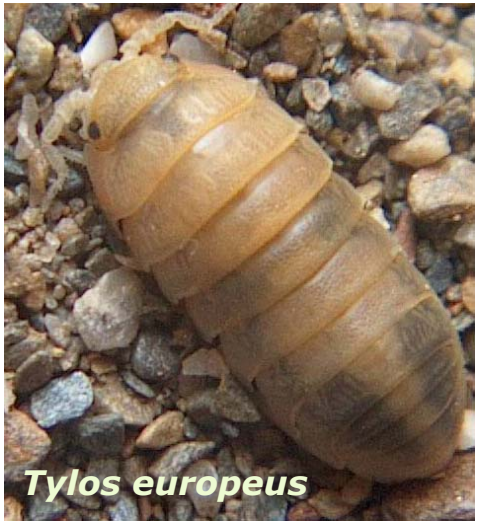
Orthoptera Larva

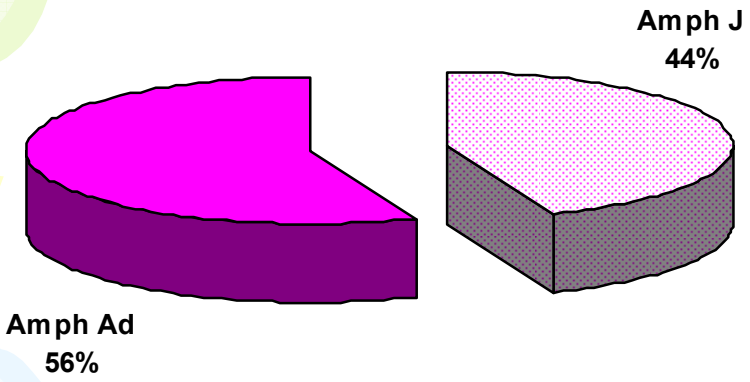
Eurynebria

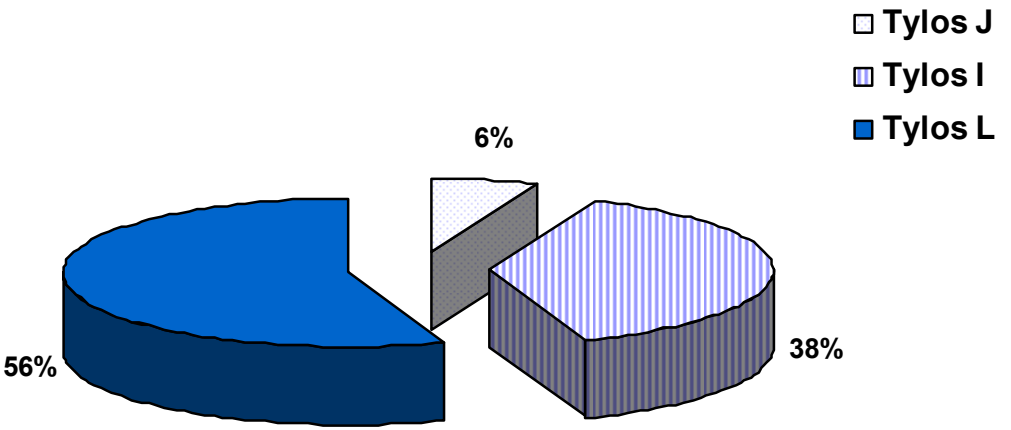


Crustaceans macrofauna



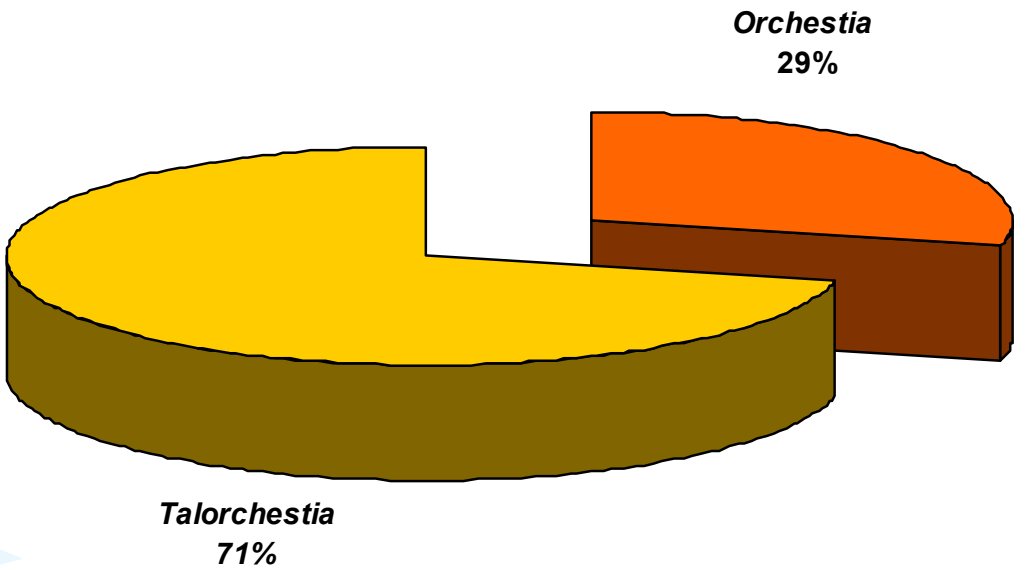






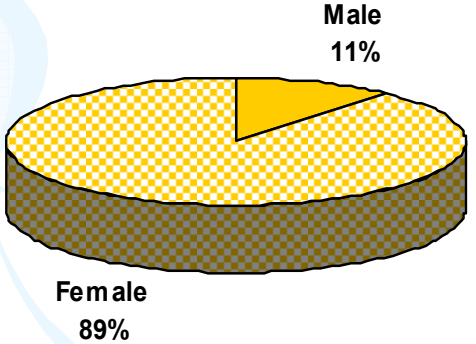
Reproduction starting earlier in Talitrids than in *Tylos*

Amphipod species

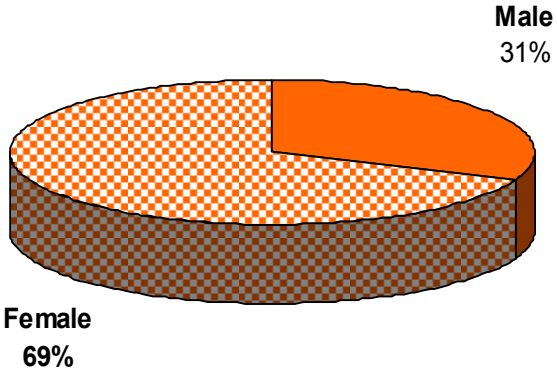


Sex ratio

Talorchestia

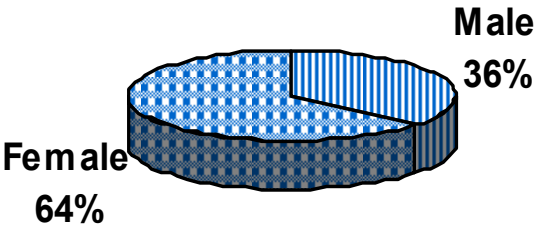


Orchestia

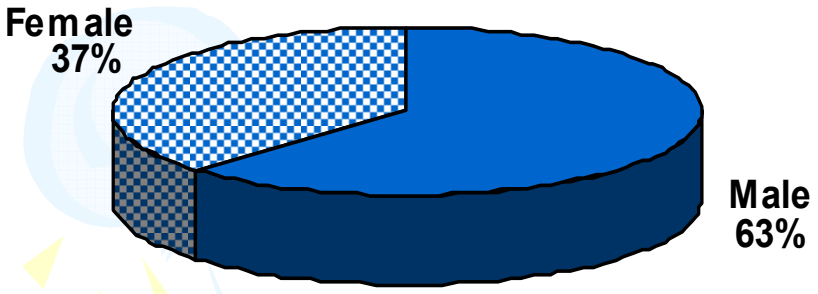


Sex ratio female biaised in the 2 species

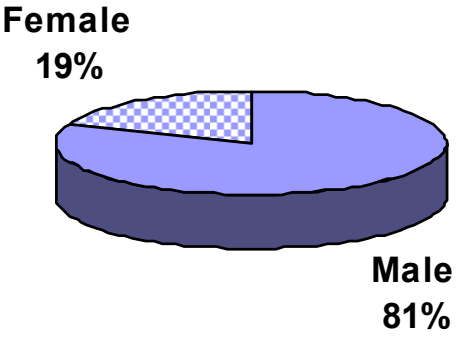
Tylos I



Tylos



Tylos L



Males larger than females

Males aged of *Tylos* are still present in the population. They disappeared after maiting.

Spontaneous activity (Transect A)

In the first day,

Only 33 *Tylos* and 160 Talitridae were active.

In the second day, more individuals exhibited surface activity:

814 of *Tylos* and 733 of Talitridae

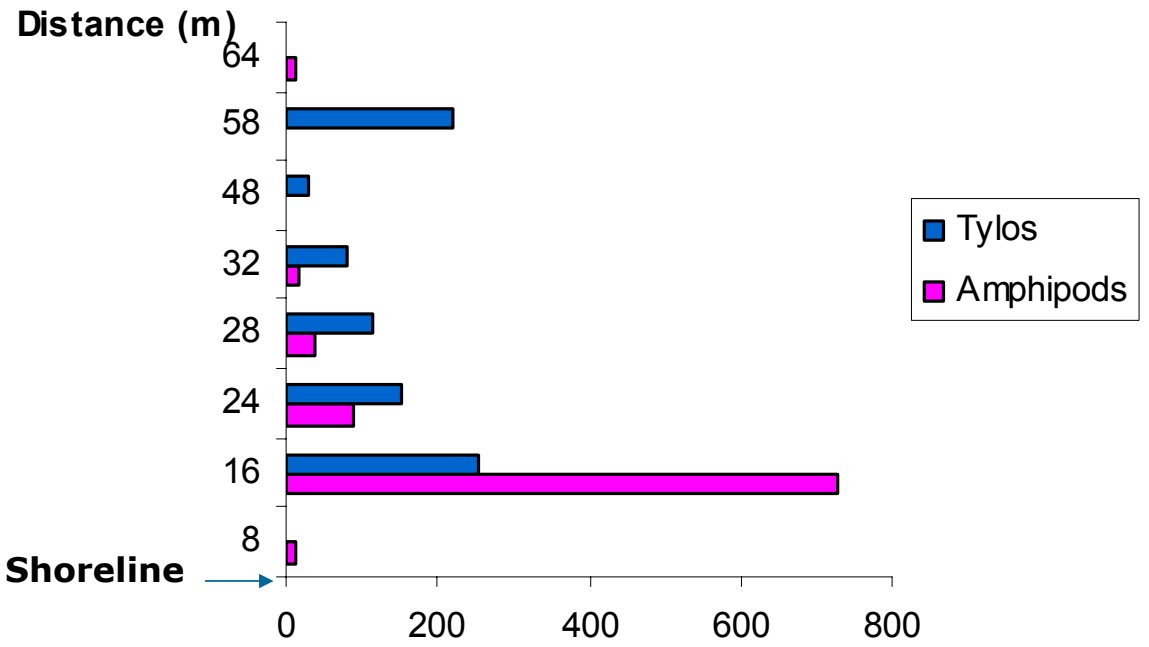
Beach crustaceans were able to reduce their activity imposed by the storm in the first day

***Tylos* seems to be more sensitive than Talitridae**

Using Wilcoxon rank-sum test, p-value = 0.0142 (highly significant) between *Tylos*

p-value = 0.1113 NS between Talitridae

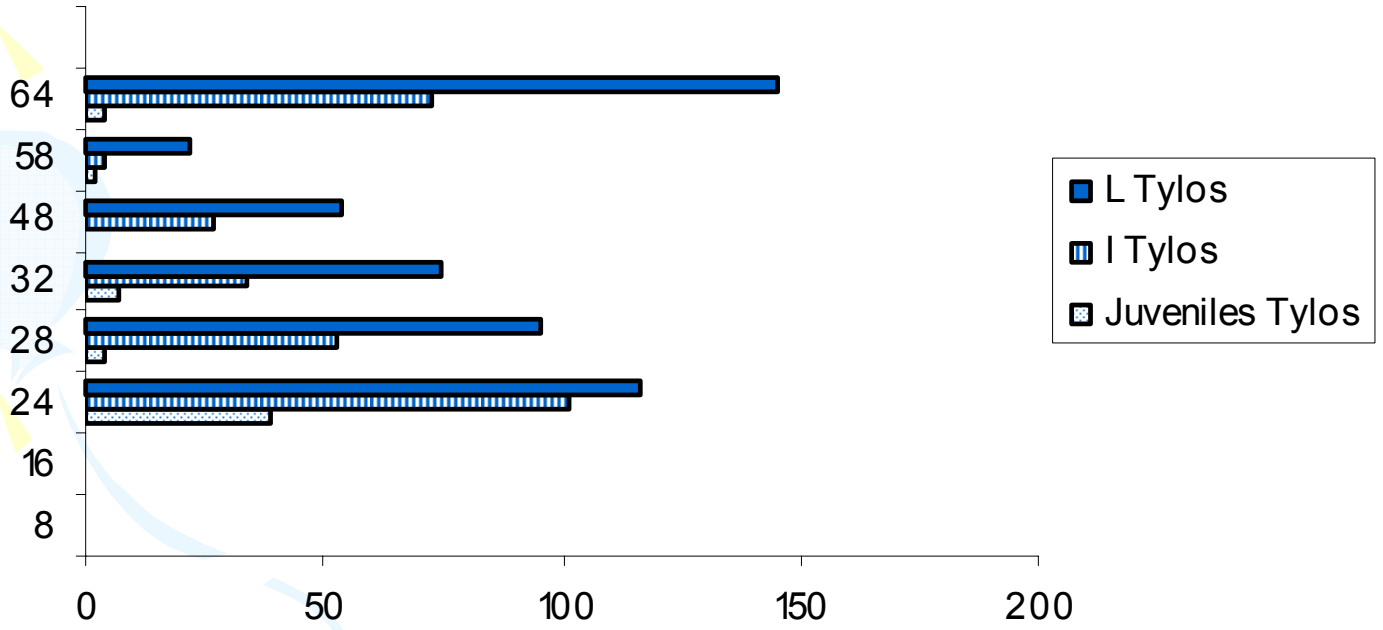
Crustaceans Distribution



Distribution along the transect

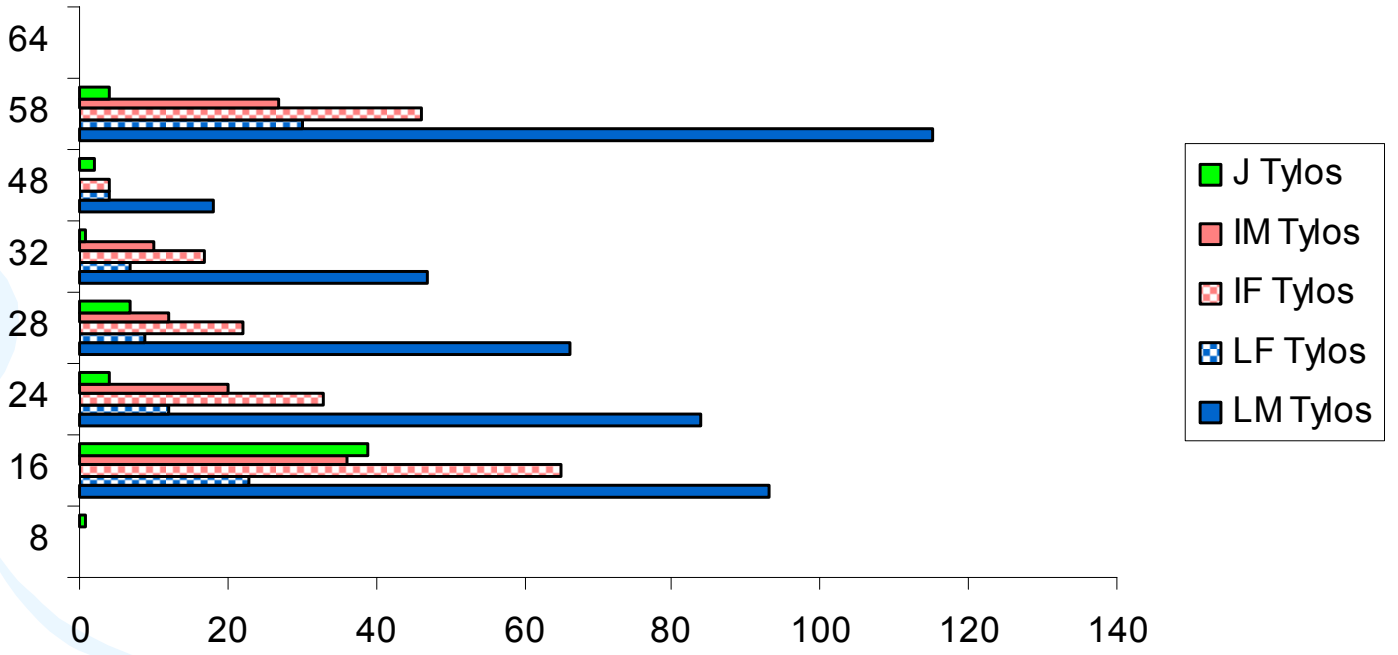
Amphipods concentrated in the low of the beach and Isopods in the low and in the high of the beach

Tylos Zonation



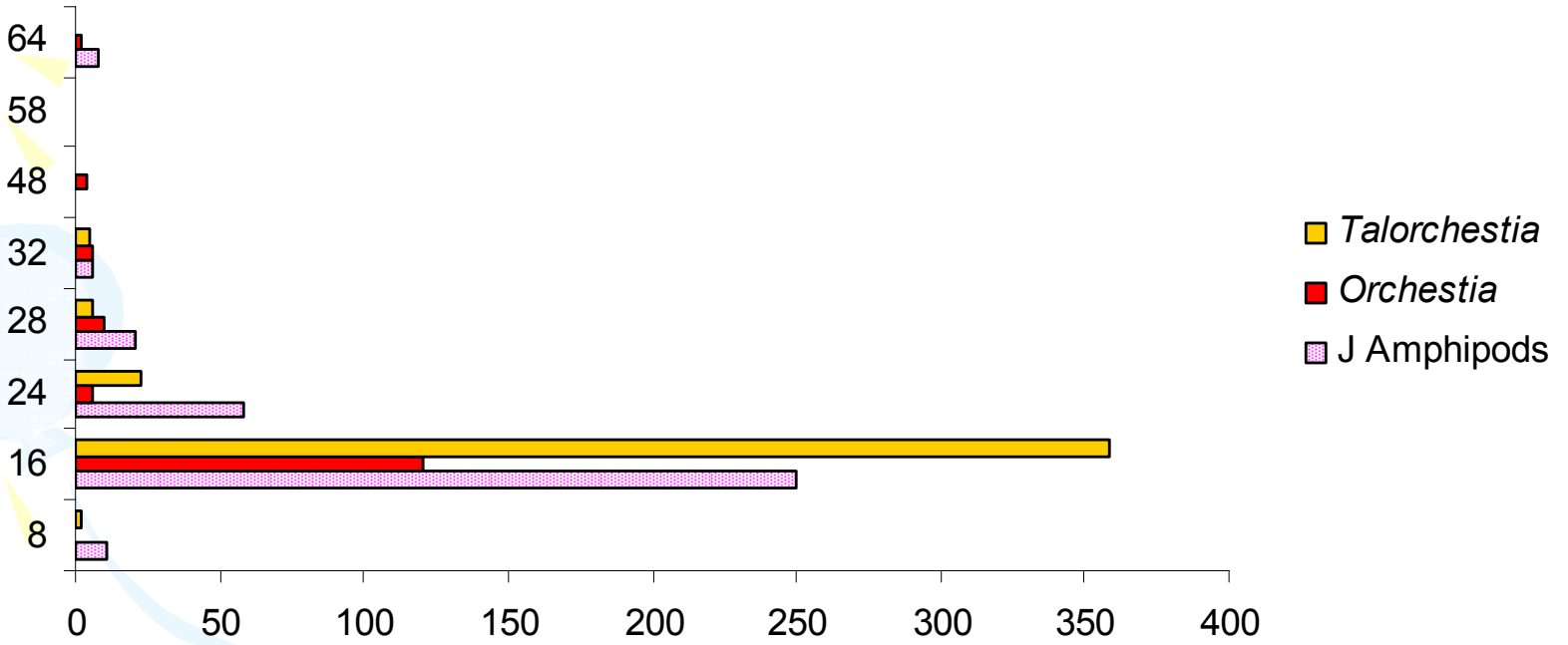
Juveniles being active closer to the sea than large *Tylos* which were more concentrated in the high eulittoral beach. Intermediate *Tylos* were active lower down on the eulittoral.

Tylos Sex Zonation



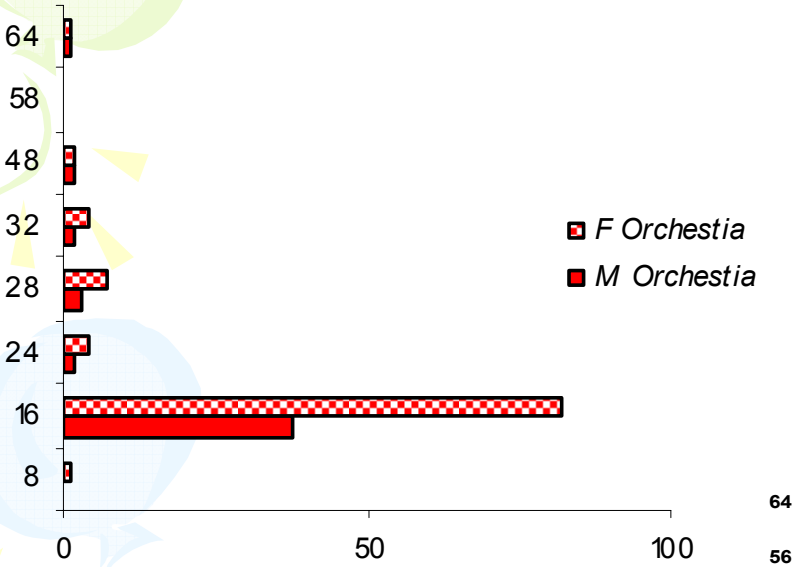
Despite the zonation along the transect, large males and females of *Tylos* were more active on the high eulittoral beach, whereas intermediate males and females were active on the low eulittoral beach

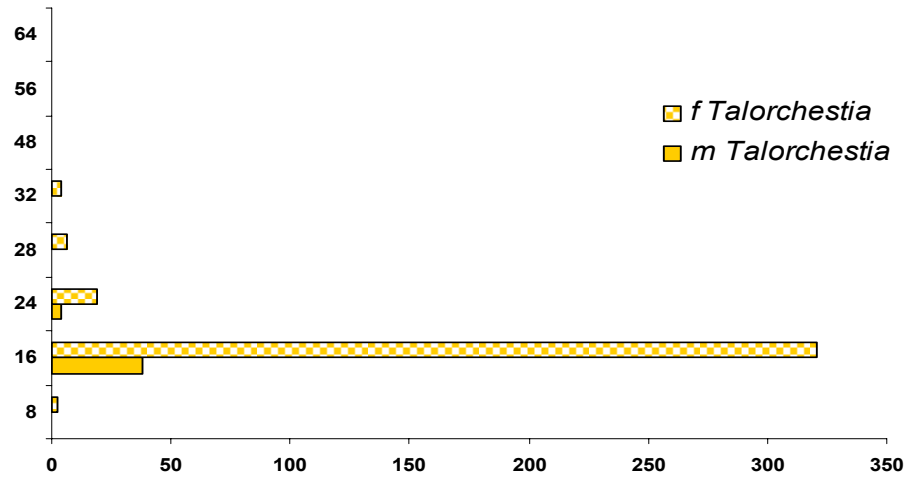
Talitrids Distribution



Juveniles and the 2 species of Talitridae closer to the sea

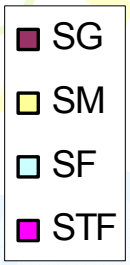
Sex Zonation of *Orchestia* and *Talorchestia*

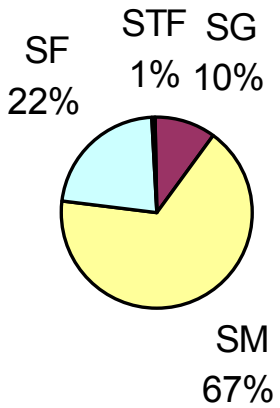




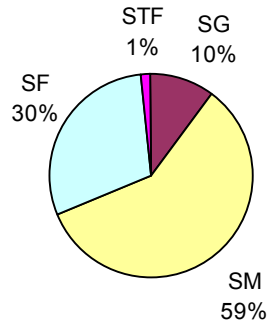
Male and female of *O. cavimana* and *T. deshayesii* mainly closer to the sea

Granulometric Analysis (Barkoukech Beach)

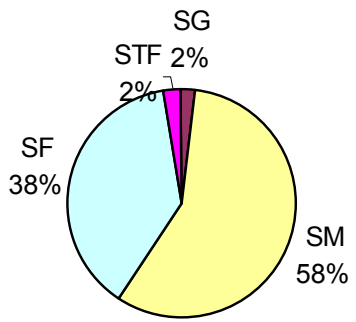




Low Eulittoral



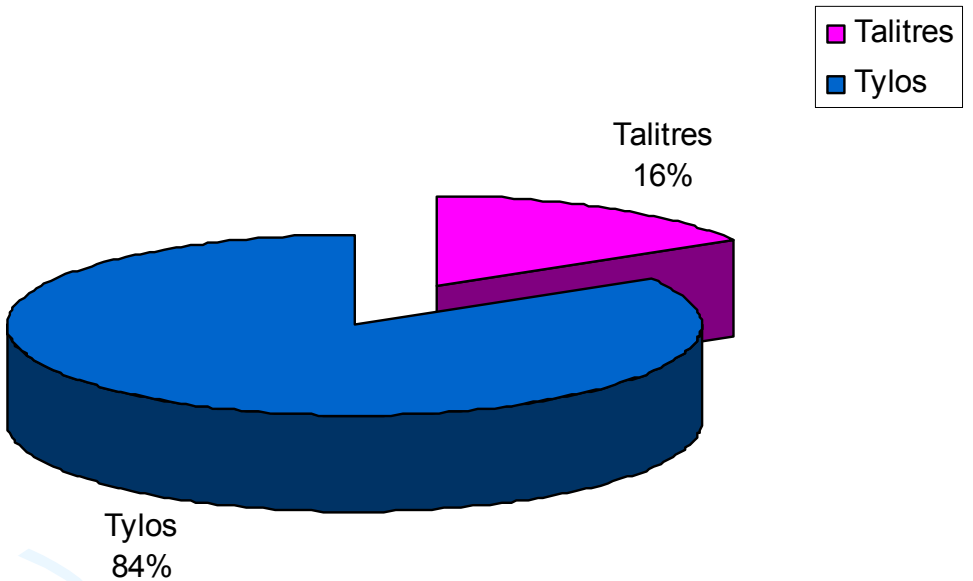
Medium Eulittoral



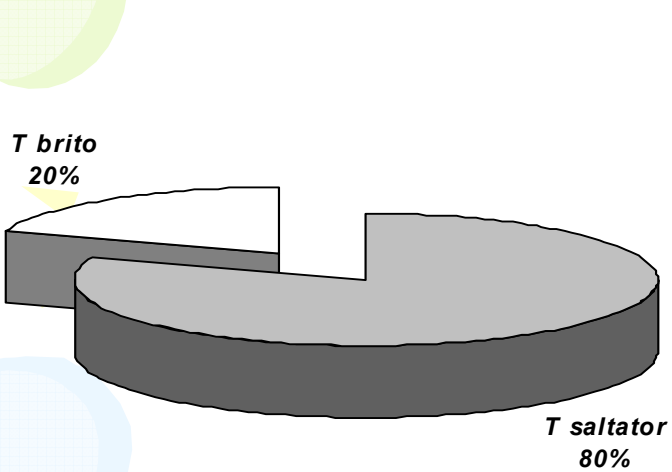
High Eulittoral

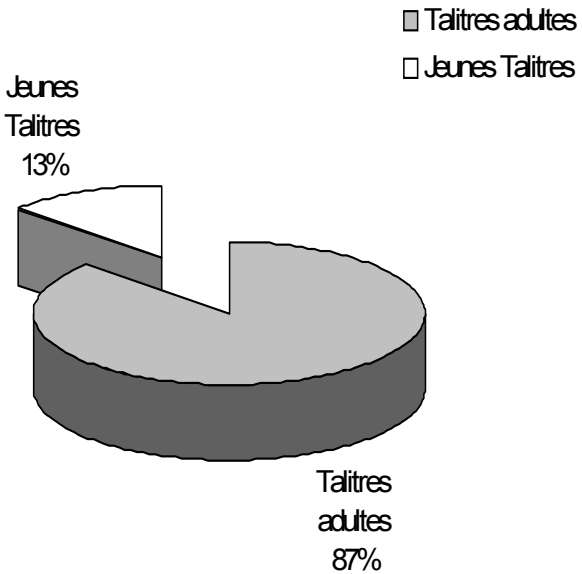
Contrary to Aouchtane site, medium an final sand constitute the major fractions at Barkoukech beach

Frequency of capture at Barkoukech

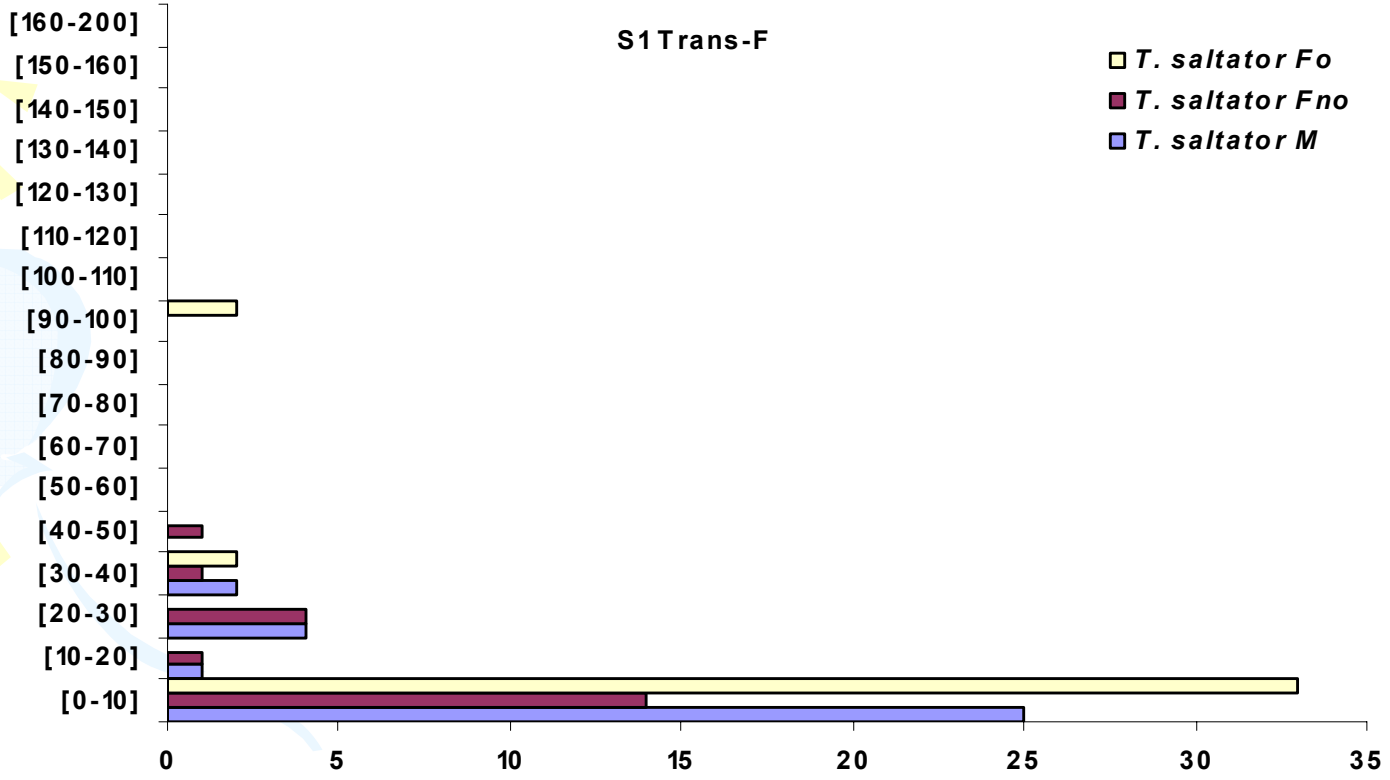


Like the Moroccan site, Isopods represented by *Tylos europaeus* are the most abundant. Two talitrids are also present, *Talitrus saltator* and *Talorchestia brito*.


T saltator
T brito
T brito
20%
T saltator
80%

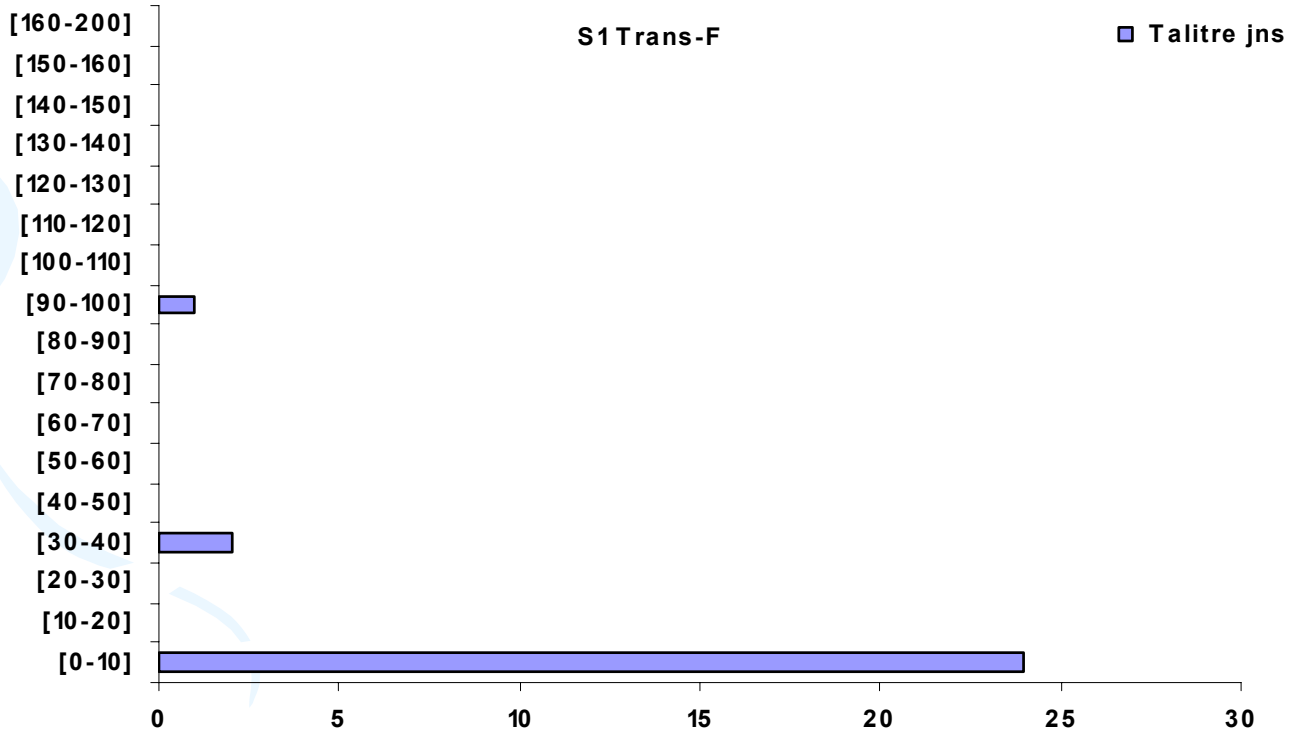

Talitres adultes
Jeunes Talitres
Jeunes
Talitres
13%
Talitres
adultes
87%

Talitrus saltator Zonation at Barkoukech (Transect cliff)



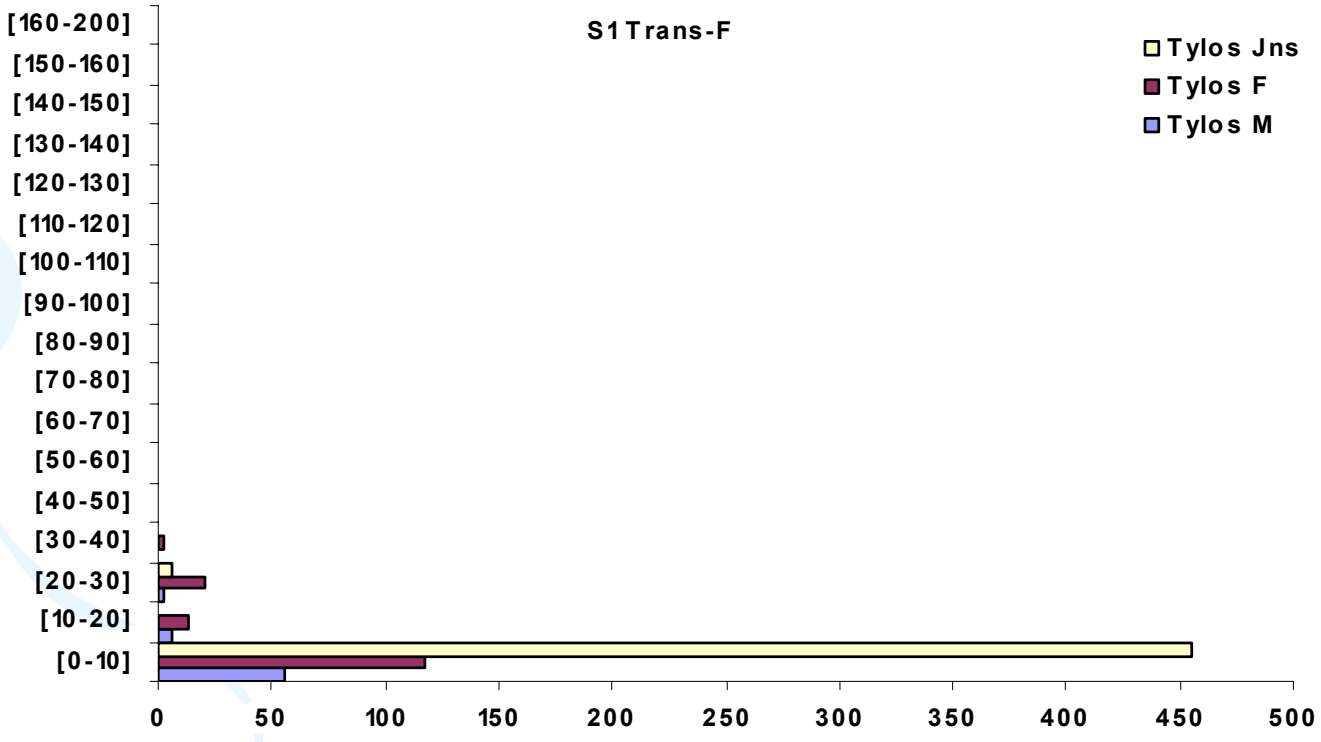
Males, females ovigerous and non ovigerous more concentrated to the shoreline

Talitrus saltator Zonation at Barkoukech (Transect cliff)



Like adults, juveniles were closer to the sea

Tylos Zonation at Barkoukech (Transect cliff)



Males, females and juveniles were more concentrated to the shoreline

- **3 abundant species living in the beach at Aouchtane and Barkoukech :**

  - ✓ ***Tylos europaeus*** **present in the 2 sites,**

  - ✓ **2 Talitridae:**

    O. cavimana **and** ***T. deshayesii*** **(Aouchtane)**

    T. saltator **and** ***T. brito*** **(Barkoukech) occurred in sandy beach**

- ***Tylos*** **was a dominant species with 71 and 84% at Aouchtane and Barkoukech, respectively**

- ***T. deshayesii*** **was a dominant species (71%) at Aouchtane and** ***T. saltator*** **(80%) at Barkoukech**

- **Sex ratio female biaised in the 2 talitrids and male biaised in** ***Tylos***

- ***Tylos*** **seems to be more sensitive to storms than Talitridae**

- **Juveniles, females, males of the different species were more active near the sea, except large *Tylos* at Aouchtane, which were more concentrated in the high beach**

- **High number of specimens collected in the Aouchtane and Barkoukech sites lets suppose the good health of these 2 sites**

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