



Harvesting of *Hediste diversicolor* as bait fishing in Local Natural Reserve of Douro Estuary, Portugal:

sustainability in a socio-cultural- economic-ecological interface

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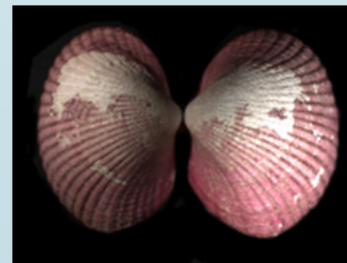
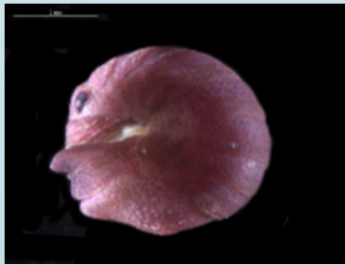
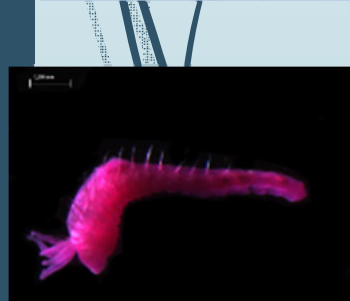
Local Natural Reserve of Douro Estuary Since 2010



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Hediste diversicolor extraction impacts in the reserve :

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http://www.aprh.pt/rgci/pdf/rgci-393_Carvalho.pdf | DOI:10.5894/rgci393

Sustainability of bait fishing harvesting in estuarine ecosystems – Case study in
the Local Natural Reserve of Douro Estuary, Portugal *

*Sustentabilidade da apanha de isco para pesca nos ecossistemas estuarinos – Caso de
estudo na Reserva Natural Local do Estuário do Douro, Portugal*

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ABSTRACT

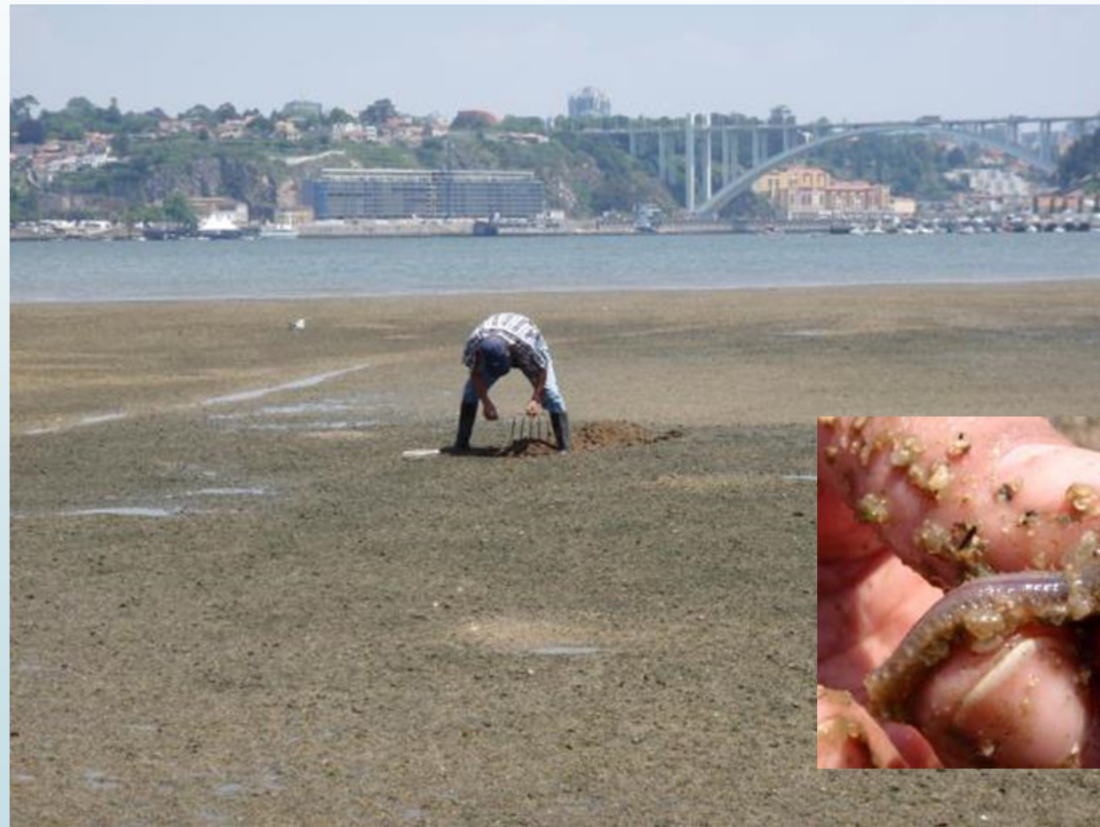
A narrow relationship between marine resources and local populations always existed in fishing communities of coastal areas. In the Portuguese estuaries bait fishing is a common practice in which gatherers collect intertidal species such as seaworms, shrimps, crabs or clams. In some Local Natural Reserves (DNUEP) this activity is forbidden due to the proximity of some fishing



Hediste diversicolor extraction impacts in the reserve :

- reduction of prey items for birds,
- resident and migratory bird's disturbance,
- habitat destruction,
- prey mortality by hand rake and trampling.

Hediste diversicolor extraction impacts in the reserve :



Hediste diversicolor extraction impacts
in the reserve :





OBJECTIVES

- 
- Contribute to the **sustainability** of bait harvesting in a protected area, the Local Natural Reserve of Douro Estuary,
 - **Bird conservation.**

Methods

- Field evaluation on the biomass of *Hediste*
- Field evaluation on bait gatherers
- Inquiry to bait gatherers
- Evaluation on production
- Evaluation on extraction
- SWOT analysis
- Proposals





Results



Hediste exploitation in the protected area

Percentage of bait gatherers by amount collected/day (g)

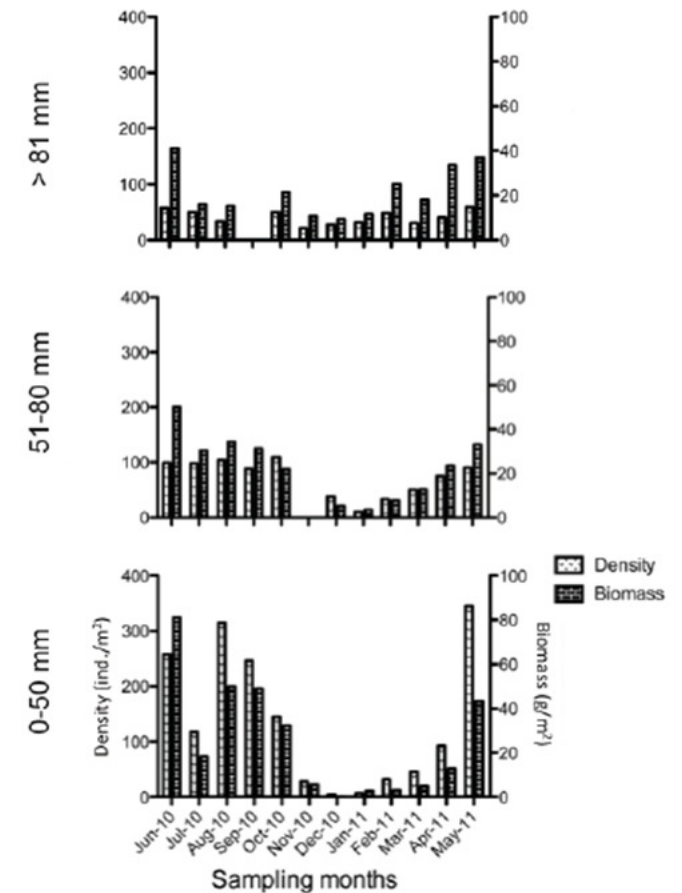
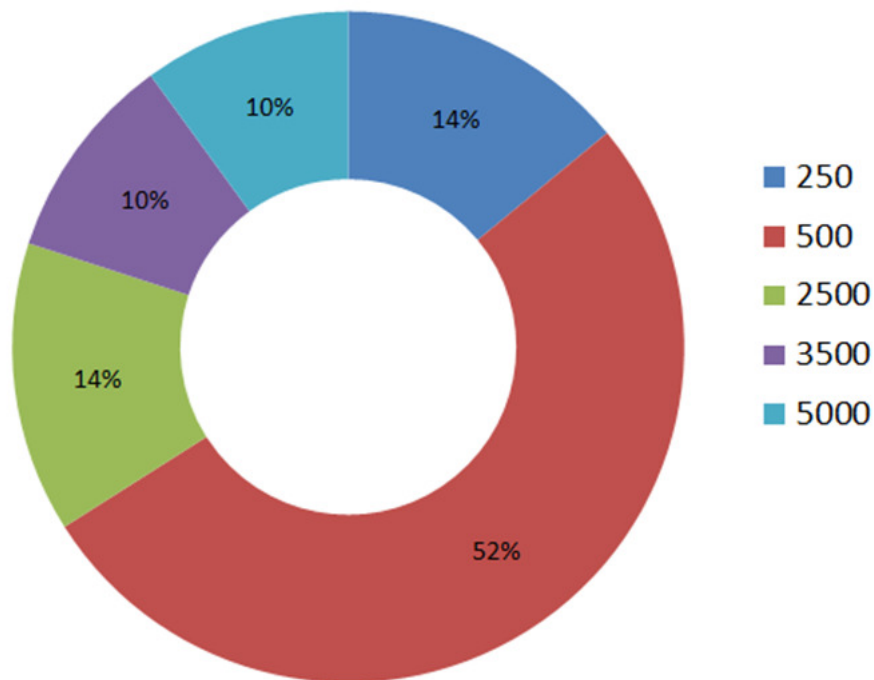
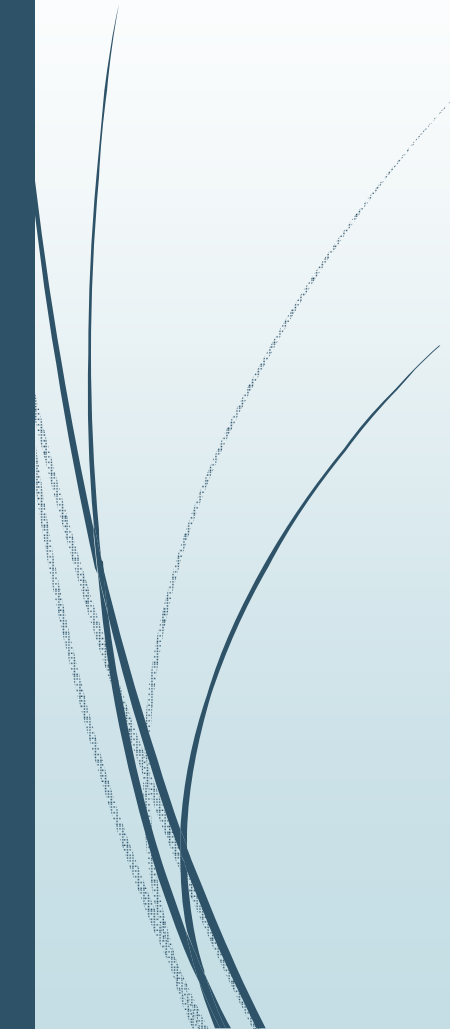


Figure 3. Density (ind./m²) and biomass (g/m²) of *Hediste diversicolor* per sampling months and by body length (0-50mm; 51-80mm and >81mm), considering all the sampled area.

Figura 3. Densidade (ind./m²) e biomassa (g/m²) de *Hediste diversicolor* por meses de amostragem e por classe de comprimento (0-50mm; 51-80mm and >81mm), considerando a totalidade da área amostrada.

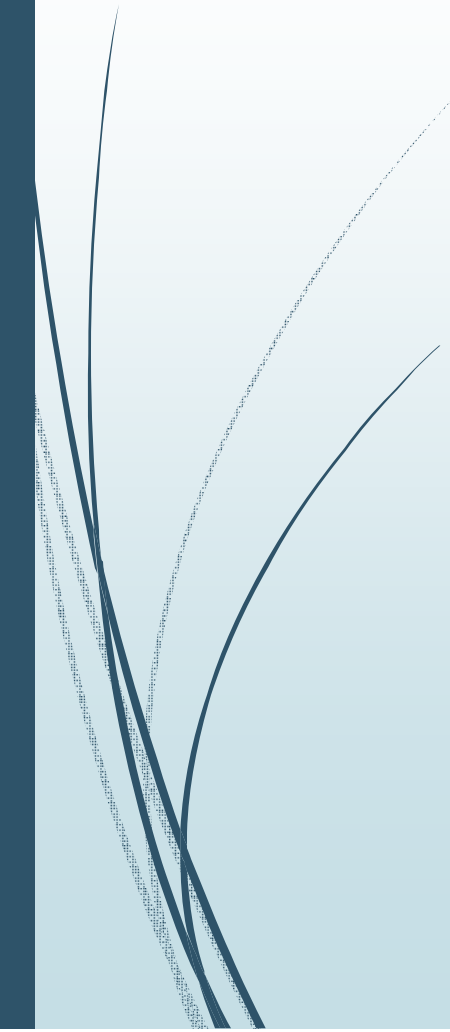


Hediste exploitation in the protected area

- 
- each year about 10 tons are removed from the area
 - the area prospected by each gatherer: 10m²/day
 - total annual productivity estimated for the entire intertidal area of the reserve: 80-140 ton
 - ...



Hediste exploitation in the protected area

- 
- ...
 - the estimated revenue for the harvesters was
3000 €/year/harvester (+/- 24000 Yuan)
 - the economic impact is quite relevant for the poor local
community (about 1/2 minimum salary)



Management rules for the future (1)

To improve sustainability of bait harvesting:

- creation of a licensing system
- individual quotas
- limited number of days for exploitation
- only for residents in the municipality
- annual delimitation of distinct exploitation areas (allow recovering)
- limit the exploited areas to the margin of the reserve
- ...



Management rules for the future (2)

To improve sustainability of bait harvesting:

- ...
- Inspection the daily exploited amount and the methods of exploitation
- monitoring bait extraction
- construction of a support infrastructure for commercialisation of the collected bait
- the trade of imported bait should be prohibited in the area, in order to minimise negative ecological impacts.



CONCLUSIONS

- our results suggest that **if** the local people are able to assure economical revenue from bait harvesting in the reserve, conservation management regulations are accepted
- to improve sustainability of bait harvesting exploitation rules were proposed and should be implemented
- with this rules, conservation of the ecosystem will be improved and the impact in birds will be reduced

Thank You.



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