

# Ecology, aquaculture-demands and genetic variability of Chilean and Peruvian surf clams (*Donax marincovichi* and *Mesodesma donacium*)

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Intertidal zones of exposed sandy beaches are commonly inhabited by surf clams of the families Donacidae and Mesodesmatidae. In Peru and Chile surf clams play an important role in artisanal fisheries. Their habitats are heavily affected by the climatic aberrations of El Niño (EN) and La Niña (LN), which have caused severe impacts on fisheries yields and adjacent industries in recent decades (Arntz and Fahrbach 1991). Beach ecology, population dynamics, molecular genetics and in vitro experiments at different temperatures will improve a better understanding on ecology, genetics and the impacts caused by different temperature regimes of both South American surf clams. Little information exists about larval distribution and the taxonomy and their susceptibility to climatically induced changes of Chilean and Peruvian surf clams. This study describes the embryonic and larval development of *Mesodesma donacium* by light microscopy. In the near future the hinge will be described by electron microscopy. Larvae were reared by a temperature of 17°C for a duration of four weeks, after this time the mortality was 100%. Increase of size is documented in breeding protocols. The use of antibiotics is discussed to decrease the mortality rates of larvae. Future work will also include *Donax* sp..

Further steps of this study are the cultivation of both species within aquaculture systems to assess the influence of environmental variables such as different temperature regimes and food requirements, stocking density, on survival and growth. Surveys conducted at northern beaches of Chile and along the Peruvian coast will provide information on the surf clams natural habitat and maturation cycle and document their population dynamics.

The macro fauna (1mm) of the northern Chilean sandy beach "Chipana" (S 21°18'20"/W 70°03'56) as a representative habitat of the surf clam *M. donacium* is collected since July 2005. The analysis of these samples are in progress. Species richness and annual fluctuation are documented and set into relation with biotic and abiotic parameters. Special focus is laid on the isopod *Excirolana braziliensis* as it is a dominating species of this beach as for tropical, subtropical and temperate Pacific and Atlantic sandy beaches of the Americas (Dexter, 1977).

The taxonomic status of the two putative species *Donax obesulus* and *Donax marincovichi* is controversially discussed in the literature (Coan 1983). To clarify the taxonomic state molecular genetic analyses (cytochrome oxidase I; CO I) on the two putative *Donax* species were conducted. Samples were taken at nine different beaches along the distribution range. Furthermore, two more *Donax* species (*Donax asper* and *Donax hanleyanus*) were collected as reference species. Results of CO I

sequenced data demonstrated well the taxonomic status of *D. asper* and *D. hanleyanus*. In the case of *D. obesulus* and *D. marincovichi* the results did not indicate a reproductive isolation.

Furthermore, the sequenced data couldn't reveal any genetic differentiation between the geographically separated *D. marincovichi* populations of the samples nine beaches. Future analysis will include additionally the sperm structure of both species, as a common tool of taxonomic determination, will be analyzed to support the genetic results.

#### References:

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