

# **Dolphins and Sharks conservation, the Argentario Mediterranean Aquarium activities**

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## **Abstract**

One of the most important activities and efforts carried out by the Mediterranean Aquarium of the Argentario and managed by the Didactic Center of Marine Biology located at Monte Argentario, consists in educating people to the marine conservation of the majority of the species, with a special care for dolphins and sharks. In the Year 2001, was signed the agreement with the Italian “Centro Studi Cetacei” (Cetaceans Studies Centre) for the recovery of dolphins and marine turtles dead on the south Tuscany’ beaches. Within 4 years, the aquarium staff, recovered approximately 12 dead dolphins and 1 saved from net. The rests of the mammals have been placed at the disposal of the Academy of Fisiocritici of Siena. Signatures were promoted and collected against sharks finning. Extensions about the Mediterranean “International Sanctuary for Mammalian” in 2002-2003 and about “Pliocene shark fossils” in 2005, were managed in agreement with the “La Specola” Museum in Florence and the Academy of Fisiocritici in Siena. The Aquarium organized short lectures and conferences dedicated to the cetaceans and sharks, involving thousands of students and schools. Little aquaria can be useful for education and conservation and could be developed a network to improve the efficiency in education.

## **Introduction**

With the important exceptions of Monaco, Naples and few other aquaria, the common idea was that Public Aquarium is a passive container of fishes. Recently the perception of the aim of Public Aquarium has changed thanks also to the efforts promoted from curators, aquariologists and all the people that take care each day of these structures. As well in Europe as in other continents, the largest part of the Aquarium are changing to: **Centres for Aquatic Life Knowledge**. To visit a modern public Aquarium, it actually means to make a "**virtual diving**", that gives the chance to observe the accurate reproduction of different habitats with their typical fauna and flora. The idea of a simple exposition of fishes has changed for a multi-functional structure where:

- experts are committed in reproducing the typical sea environments, the most faithfully similar to those natural ones
- is possible the development of technical tools for the fauna and flora husbandry
- didactic activities are carried out
- stages for university students are promoted
- programs of spreading with thematic extensions, conferences and sensitising of the public take a very important place
- basis and applied research are developed
- scientists are involved in conservation and recovery of aquatic species

The European Union Guideline 1999/22/CE concerning zoo and aquarium declares: (art.1) “**to protect the wild fauna and to conserve the biodiversity through the adoption of measures for the release of the opening permission and the inspection of the Zoological Garden (Aquaria belong also to this category), in order to strengthen the role in the conservation of the biodiversity**”. It also

declares that, "in order to assure that the zoo (and aquaria) carry out adequately their important role in the conservation, education and research, is necessary to create a common legislative basis in the European Community Countries for the release of permits, husbandry of animals, inspections, training of the staff and education of visitors." This EU guideline means that the aquarium curators will play a still major role in developing education, research and conservation for the aquatic world and also their responsibility to the public opinion. Each kind of aquarium, little or big will necessary follow this guideline. This kind of approach and the results obtained, will help curators versus animalist groups, in order to show as useful it is the modern public aquariologist world. In Italy, few public aquaria are active and people don't know so much about them and their important role in environmental education and biodiversity safeguard. Recently, in March 2005, the European 1999/22/CE guideline was implemented in Italian national law so that rules have to be followed in order to open new aquaria and to maintain the already active ones. This is an important step so that also in Italy be developed University programs for curators, aquariologist or aquarium technicians and so that the curators or aquariologist job list and their role be clear. Anyway, The Argentario Mediterranean Aquarium, since when it was opened in 2001, tried to follow his main mission: to educate people to marine environment respect, to improve the knowledge in aquatic animals husbandry. First steps to develop this mission were decided to be:

1. to organise volunteers group for dolphins and turtles saving
2. to plan thematic expositions concerning cetaceans and sharks
3. to promote expert conferences and short lectures
4. to improve husbandry in Mediterranean little sharks like catsharks or smoothhoundsharks
5. to collaborate and sharing informations with fishermen to educate them
6. to stay in touch with other aquaria and curators

## Material and methods

The Aquarium of Monte Argentario from the opening day, on 14<sup>th</sup> of June 2001, showed to be deeply engaged in developing its main mission, that is to transform itself in a "Centre for Marine Life Knowledge". The centre planned and developed several didactic, research and conservative programs like:

- **theory and field lessons in marine biology**
- **guided tours, with marine biologists in the aquarium**
- **boat tours along the Argentario coast just for students**
- **sea extensions** concerning; Marine Mammals life history, Fossil Sharks, Oceanography etc.
- **stages and training** for University students in Marine Biology
- **recovery programs** with scientific associations like "Centro Studi Cetacei".
- **research activities** with Siena University about;
  - Monitoring of *Posidonia oceanica* meadows along Argentario coasts, with Siena University
  - Ecotoxicology protocols development with Siena University Biomarkers group.
  - Octopus breeding and juveniles growing, in an aquaculture project in agreement with Padova University, Federcoopescas and Italian Office of Agricultural and Fishing Resources
  - Husbandry of several Mediterranean marine species

- Catsharks (scyliorhinidae) breeding and juvenile growing
- Posidonia oceanica meadows husbandry in aquarium

Concerning the conservation, several tools and special attention to Dolphins and Sharks were provided.

**DOLPHINS:** Because the Aquarium is located inner the “**International Marine Mammals Sanctuary**” a special care was given to dolphins and whales. The agreement with the Italian “**Centro Studi Cetacei**” (Cetaceans Study Center) in the Year 2001, was signed for the recovery of dead dolphins on the south Tuscany beaches. Firstly was accepted and implemented in the Aquarium staff the CSC action protocol, in order to coordinate the staff with CSC experts and Coast Guard. The technical sheets (pic.1) and specimen recovered (pic.2) are sent to the Academy of the Fisiocritici of Siena for the Museum and national CSC database.

(pic.1)



(pic.2)

The Centro Recupero Cetacei staff of Argentario Aquarium, consists in 2 full time people and 10 volunteers which can use the Aquarium boat “La Favorita”, a 10 meter boat equipped to operate with cetaceans 4 m length maximum. The staff is active 365 days per year and is supported by CSC S.O.S. dolphin recuperation tools.

Several workshops and short lectures were performed to share with the public the knowledge from researchers about the safeguard importance and the activities developed to improve it, the mammalian biology and the Mediterranean state of the stock. On December 2001 about 200 university students, and experts from Italian universities participated to the “5<sup>th</sup> National Meeting of Cetacean Study Center” (pic.3) and each year from 2003 to 2005 in summer were performed shortlectures to the aquarium staff and visitors about biology, ecology and recovery rules by Prof.T. Renieri and Prof. L. Marsili (Siena University – CSC members). Besides from 2002 to 2003 an important exposition was proposed: “The International Mediterranean Mammalian Sanctuary”. It was developed with the help and collaboration of “La Specola” Zoological Museum in Florence and the Academy of Fisiocritici in Siena, which offered several interesting bones and skeletons from whales and dolphins kept in Tuscany beaches

along two centuries. Parts of Spermwhales (*Phiseter macrocephalus*), killerwhale teeth (*Orcinus orca*) bottlenois and dolphins mouths and teeth (*Tursiops truncates*, *Delphinus delphis*), a complete ziphius skeleton etc.



(pic.3)

**SHARKS:** the Aquarium activity about sharks conservation concerned two different directions. Educative approach and research activity. The challenge is, to let the people understand that the myth about the shark “just a killer” is not exact. In fact, we tried to explain that sharks are: an evolutive issue, very well specialised and particularly in danger for the overfishing and sea pollution.

- The **educative approach** consisted in organising: a) thematic extension (2005), b) lectures (2004-05) and c) didactic expeditions (2003-05).
  - A) With the agreement of Academy of Fisiocritici in Siena was possible to show along all the year 2005 the extension: “**Tuscany Pliocene fossil sharks**”, with a lot of fossil teeth and sharks model.
  - B) On June 2002 shark expert from ICRAM spoke during a short lecture in the Didactical room of the Argentario Aquarium and left identification sheets from I.C.R.A.M., concerning the program, “Large Elasmobranch Monitoring”. On March 2004 a shark day conference was organised still by the Aquarium in a bigger conference room. Three shark experts spoke about different Mediterranean species and their biology.
  - C) Didactical expeditions were organised, from 2003 to 2005, by the aquarium curator, in SouthAfrica Gansbaai, in order to spend a week with: the Great White Sharks (pic.4) and to share with the biologists the knowledge developed along years spent studying in the field, these kind of sharks (Michael Scholl and Jenna Cains). After spent the morning, diving in cage in front of the great white, in afternoon, lectures were dedicated to the biology, behaviour, photoidentification, Dyer island ecosystem, free diving etc (pic.5).



(pic. 4)



(pic.5)

- The **research activity** consisted in: a) performing husbandry techniques for Mediterranean sharks like catsharks (scyliorhinidae family), b) to develop university degrees in shark biology, c) to improve the knowledge about places in Monte Argentario coasts where catsharks spawn.
- Since 2001 were hosted in different aquaria several specimen of *Scyliorhinus canicula* and *stellaris*, *Mustelus mustelus*, *Carcharinus melanopterus*, *Oxynotus centrina* and different species of skates. Good results were obtained with catsharks and smoothhoundsharks. The black tip survived just 18 months and died probably for a pollution feeding problem. The oxynotus specimen kept by fishermen at about 80 m deep, survived just one month.
  - Two university students spent their degree stage in aquarium to develop the degree thesis, from Kiel University in Germany and Siena University.
  - A research program is in progress concerning: Catsharks nursery sites in M.Argentario coasts. Scubadivers are involved, they received sheets to report the nursery coordinates, the number of eggs observed, the size etc.


**PROGRAMMA MONITORAGGIO NURSERY**  
**SCILIORINIDI A M. ARGENTARIO**  
 Gattopardi e gattucci




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**Avvistamento uova in aquarium**

Data  Ora  Coordinate  Profondità   
 Numero di uova:  Dimensioni approssimative - Lunghezza cm.   
 Stato delle uova:  Embrioni visibili   
 Note:   
 Dal Avvistatore (facoltativo)

## Results and conclusions

Concerning the dolphins conservation activity since 2001, results are:

- One national workshop organised in 2001 in agreement with Italian **Centro Studi Cetacei** “5<sup>th</sup> National meeting about Cetaceans and Marine Turtles”, about 200 participants.
- Four lectures organised on from 2002 to 2005. 2002: “**Bottleneck dolphins along the South Tuscany coasts**” by L.Fattorosi and “**Ecotoxicology problems with Mediterranean**

*cetaceans*” by L.Marsili, 40 participants. 2003 and 2005: “***Biology and ecology of cetaceans and saving protocols*** by T.Renieri and L.Marsili, 50 participants.

- Thematic extension on 2003 about: “**International Marine Mammals Sanctuary**” by Accademia dei Fisiocritici in Siena and Zoological Museum “La Specola” in Florence. 21.000 visitors and about 2000 students involved.
- 12 dead specimen, 3 species of dolphins, kept along the south Tuscany coasts (tab.1)
- Hundreds of monitoring sheets, shared with fishermen, tourists and coastguard.

Species	2001	2002	2003	2004	2005	Tot.species
<i>Tursiops truncatus</i>	0	3	1	2	0	6
<i>Stenella coeruleoalba</i>	1	1	2	0	1	5
<i>Ziphius cavirostris</i>	1	0	0	0	0	1
<b>Tot. Specimen</b>	2	4	3	2	1	12

Tab.1 List of the dead cetacean kept by Argentario Aquarium staff

Concerning the shark conservation activity since 2001, results are:

- Two short lectures and one workshop since 2002 to 2005. On 2002 I.C.R.A.M. shark expert S.Clò, spoke about; ***Baskingshark biology and saving protocols***, the Aquarium Curator P.Micarelli spoke about: ***Great white shark feeding behaviour in Dyer Island (Southafrika)***. 50 participants. On 2004 was performed a workshop about Mediterranean sharks: ***Baskingshark and Blueshark biology (Cetorhinus maximus, Prionace glauca)***, by S.Clò, ***Greyshark biology (Carcharinus plumbeus)***, by E.De Sabata and S.Clò, ***Shark finning and overfishing in Europe***, by I.Bianchi, 50 participants.
- One thematic extension on 2005 about: **Tuscany pliocene fossil sharks**. 20.000 visitors and about 2000 students involved.
- Three didactical expeditions were organised on 2003-2004 and 2005 by the aquarium curator to discover the behaviour and the conservation need of white shark (*Carcharodon carcharias*) in South Africa. 34 participants, 70 different specimen of white sharks recorded and data collected about great white shark surface behaviour with passive preys.
- Good expertise in Mediterranean catsharks (scyliorhinidae family) husbandry and captivity breeding. About 30 specimen of *Scyliorhinus canicula* and *stellaris* hosted and born in aquarium. Actually included in the AEA International Elasmobranch Census
- First partial results about *Oxinotus centrina* survival in captivity, about 1 month.
- Three smoothhound (*Mustelus mustelus*) specimen survived in aquarium about 1 year, one of them died after 12 months, the other 2 left free after 12 months in open sea because too much bigger for the tank which hosted them. When they were released in open sea they were about 70cm long from 30cm when arrived in aquarium.
- University stage for Biology degree. First one on 2003 from Kiel University in Germany Sylvie Boheme about “***Catshark (Scyliorhinus stellaris) feeding strategies in captivity***”. Second one from Siena University, Sara Spinetti, she is performing the degree stage observing: ***Growth and feeding of juveniles catsharks (Scyliorhinus stellaris) in captivity***.
- Research program in progress about: Catsharks (Scyliorhinidae family) nursery sites in M.Argentario coasts.
- Hundreds of sheets from “**Large Elasmobranch Monitoring Program**” were shared with

fishermen, tourists and coast guard.

Thanks to the Argentario Aquarium experience, it is possible to suggest the development of a network of small structures, like that one in Monte Argentario, well connected with fishermen, tourist operators, diving centres, schools, research institutes, public authorities in the management of the marine resources. All these aquaria, all along the Italian coast and connected with European aquaria, could allow to develop a national and European system to support the management and the conservation of the marine resources and the biodiversity.

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