MAREAMICO
ASSOCIAZIONE ECOLOGICA SCIENTIFICA

20th CONFERENCE ON THE SEA

Solidarity and friendship between mediterranean Countries
(How to solve mutual environmental problems)

with the collaboration of:

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Il Segretario Generale
della Presidenza della Repubblica

Roma, 25 GIU. 2009

Gentile onorevole,

la ringrazio, a nome del Presidente della Repubblica, dell'invito a presenziare alla XX Rassegna del Mare, in programma dal 9 al 12 luglio prossimi a Roma. Concomitanti impegni istituzionali, previsti da tempo, non consentono, purtroppo, di accogliere la sua cortese richiesta.

Il Capo dello Stato, che non ha mancato di sottolineare la necessità di adottare politiche idonee ad assicurare un equilibrato utilizzo del mare e delle sue risorse e la salvaguardia dell'ecosistema che racchiude, insieme all'augurio di successo della manifestazione le invia un cordiale saluto, cui unisco il mio personale.

Donato Marra

On. Roberto Tortoli
Presidente dell'Associazione
"MareAmico"
Piazza Benedetto Cairoli, 2
00186 Roma

Il saluto del Presidente dell'Associazione Mareamico On.le ROBERTO TORTOLI

When Mareamico Assembly asked me to become President of the Association, I requested a brief period of reflection to enable me to correctly evaluate the compatibility between my ongoing political office and the Presidency of an atypical Environmental Association that is very much committed to scientific research, from the development of strategic plans to the proposal of effectively viable projects.

Pino Lucchesi contributed to doing away with my perplexities by assuring me continuity on both long-term and future perspectives.

Now, just a few months later and having already acquired some significant experiences such as the recent Conference on the Lagoon of Orbetello, I must admit that my doubts have dissipated and I am prepared to tackle my first "Rassegna del Mare" with enthusiasm and a constructive mindset.

***"My"** first **"Conference on the Sea"** coincides with the 20th edition of Mareamico's most relevant annual event and essentially also with the 20th Anniversary of the Association, a significant milestone representing the fruit of long years of commitment and dedication.*

After becoming aware of the impossibility of holding the event in Pescara concomitantly with the Mediterranean Games (as previously agreed with the Government Commissioner for the sports event), the Executive Committee of Mareamico decided to choose Rome (and later Ostia) as the venue for the aforesaid Rassegna, scheduling a sequel in Libya, Algeria or Montenegro for next October.

This decision was aimed at maintaining the essential characteristics of an Event that is strongly focused on the Countries bordering on the Mediterranean, while simultaneously drawing attention onto its Anniversary (with the inauguration scheduled to be held in the City Hall on Capitol Hill) and counting on the strong participation of Institutional Delegates, international scholars and the young "Environmental Ambassadors of Mareamico", with a view to launching a tangible message especially targeted to younger generations. Therefore, the Event shall include different phases, both formal and informal, but all consistent with an international collaboration strategy to which Mareamico has been contributing for many years now through its friendly relationships and progressively expanding networking.

This is precisely the concept that inspired the "Rassegna 2009" edition (Solidarity and Friendship in Solving Common Problems), as we are aware that only inter-personal acquaintance and cooperation can progressively improve relations, solve misunderstandings and develop the idea of a common destiny, even in this difficult phase in the inter-ethnic relations between different peoples.

And this, in a nutshell, is the past and present commitment of Mareamico.

Roberto Tortoli

Intervention on Environment and Territory and Sea Protection
M.P. STEFANIA PRESTIGIACOMO

I would like to thank the Association Mareamico and his President, my friend and colleague Roberto Tortoli, for their renewed engagement in favour of environment and coastal and maritime ecosystem, in particular.

This year, the Conference of the Sea coincides with the 20th anniversary of Mareamico activity. It is a short time, if we consider the slow enhancement of behaviours and approaches. Nonetheless, it is quite long to allow a deep evaluation of present changes and to decide actions and interventions.

This is a general remark which can easily be applied to the Mediterranean Sea.

The Mediterranean Sea, in these years, has suffered deep changes, partially due to human intervention. Such changes have brought pollution problems, mutations in marine fauna and flora, habitat depletion and irregular proliferation of foreign species.

In this respect, we need a strict environmental control, as well as an ongoing research to produce immediate useful and, especially, exact information, in order to give concrete answers in a short time, as Mareamico has been doing.

However, this is not enough, because problems due to demographic growth and conditions, the irrepressible desire to improve quality of life and economic situation, the ongoing movements of citizens towards coastal areas, need specific policies and medium and long term planning.

Therefore, it is essential to involve all institutional and scientific bodies of the Mediterranean countries, in a unique framework and in an ongoing collaboration, to favour all necessary interventions to interpret and to plan the future.

By this event, and the following conference in October, Mareamico goes ahead with research and enhancement of relations with Mediterranean countries, paying special attention to Maghreb countries, according to the new collaboration guidelines promoted by the Italian government. It is a praiseworthy action which has to be fully supported.

My Ministry will follow the work of the 20th Conference of the Sea with great attention and will take into due account the indications that will arise from it.

MP. Stefania PRESTIGIACOMO
Minister for Environment and Territory and Sea Protection

The Italian Minister of Infrastructures and Transports
Hon. ALTERO MATTEOLI

Often times, in the course of my experience in previous governments and when I was Minister for the Environment, I had the opportunity to follow and grant my support to the meritorious action of ***Mareamico Association.***

This Association is presently chaired by Mr Roberto Tortoli, who was amongst my closest collaborators at the Ministry for the Environment, since, at that time, he was Undersecretary.

Two weeks ago, I had the opportunity to meet the managers of the Association as well as some distinguished members of its Scientific Board at a congress on transition and lagoon waters that took place at Orbetello, the town where I serve as mayor.

The environment still remains a priority issue for my present mandate as Minister for Infrastructures and Transportation, especially as regards a series of important questions. It is enough to think of the need to reduce the impact of infrastructures on the environment. Nonetheless, even though Italy shows a complex situation in terms of anthropic distribution and urbanization, the carrying out of major works is absolutely necessary also to relaunch the competitiveness of the Italian industrial sector and of the economy in general. The ecological issue, almost unknown or marginal in the post-war period, has rightly become a political priority; this present attitude is to be considered as positive, if it is not biased by ideological or specific interests.

The present Berlusconi government focuses its attention on this issue and is trying to combine it with the attempt to close the infrastructural gap between Italy and the most advanced countries of the European Union; this would also enable us to overcome the present uncertainties.

Anyway, the recovery measures cannot be limited to the national approach, since important solutions for the national industry could also come from abroad.

It is why the activities of associations such as Mareamico, though unknown to the public at large, are of extreme relevance, since they contribute to the creation of positive forms of collaboration between nations. If this concept holds true from a general standpoint, it becomes even more important, if applied to the relations with the Southern Mediterranean countries. In recent times, the ties between Italy and the countries of the Southern Mediterranean border have become closer and more binding, as demonstrated by the agreements, that I have followed personally, between Libya and Italy, for the construction road infrastructures by Italian companies, and between Egypt and Italy.

The Minister for Cultural Heritage and Activities
Hon. SANDRO BONDI

If there is a field of activity in which protection policies are closely intertwined, this is precisely the field of environmental protection, to the extent that it is sometimes highly problematic to draw a demarcation line between where environmental protection ends and the safeguard of cultural, historic and artistic heritage begins.

This unarguable fact, which is generally true and ubiquitously applicable, is all the more felt in the case of a Country such as ours, so fragile and anthropized, yet so rich in cultural and environmental landmarks…and also so rich in potentials yet to be disclosed.

These two sectors also share the need to combat crime, unauthorized constructions, the so-called real-estate "monsters" that so disfigure our coasts, the trafficking of objects of our cultural heritage, the impoverishment of our seas and of our national territory. This also raises the need of disposing of adequate means of pre-emption and dissuasion, as well as sufficient financial allocations that might enhance the already praiseworthy work of law enforcers and more specifically of those dedicated to safeguarding our heritage.

Furthermore, in this complex matter, it is self-evident that close cooperation is needed between Countries, something that is particularly important in the case of the Mediterranean, a sea touching the shores of Countries whose "histories and civilizations" are also often closely intertwined, blended, overlapping and cross-fertilizing.

This is another reason why the Ministry that I direct focuses particular attention on the activities of Non-Governmental Organizations like Mareamico, which have set themselves the goal of fostering international relations and relationships with an integration-oriented action that is no less important than the "official" actions of Governments and International Institutions.

This cooperative spirit, just to mention an example of situations that will be addressed during the proceedings of Rassegna del Mare, is absolutely essential in any action aimed at finding, recovering or securing underwater sites that often pave the way for exceptional discoveries and findings like in the case of the Riace Bronzes or of the "Dancing Satyr" of Mazara del Vallo, sites that are only too often left invigilated and thus fall prey to looting and tampering.

I would like to reassure my colleague and dear friend Roberto Tortoli of my commitment to attentively follow and support his ***Mareamico Association****.*

Solidarity and friendship among Mediterranean Countries for quality of life

Mr. MOHAMED MEHDI MLIKA - *Consultant of Prime Minister - President of AREMEDD - Tunisia*

For decades the environmental sector has been capital for the development of Tunisia, governed by Mr. President Ben Ali. Our cooperation with the European Union and its member states started in the 70s and it has been strengthening since then, putting Tunisia in a respectable position as for environmental protection and quality of life.

*Our cooperation with Italy goes on strengthening, underlying a strong bond between Italian people and Tunisian people. Actually, the common contribution of **AREMEDD** and **MAREAMICO** to the enhancement of quality of life illustrates such a cooperation, not only in a spirit of neighbourliness, but also in terms of complementarity and solidarity. Moreover, it is an edifying example in the Mediterranean area where we need peace and security in order to enhance quality of life, through a global, fruitful and lasting cooperation.*

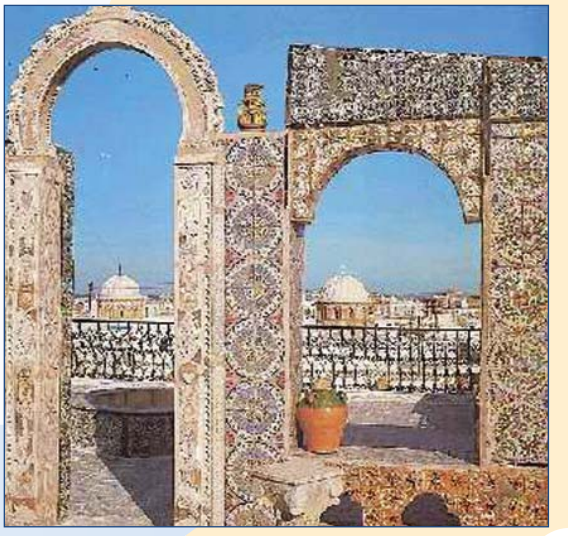
Quality of life results from human actions aiming at enhancing life conditions through environmental protection and sustainable development. This is not only a tradition for Mediterranean Countries but also a widely shared conception of life. Moreover, cooperation is the expression of our Mediterranean civilization, constantly enriched and renewed.

All coast countries are concerned by problems affecting the Mediterranean sea, - which is in danger of death -, such as the dramatic impact of marine pollution, destroying flora and fauna and biodiversity in general, or other problems relating to dangerous effects of climatic change.

We are called to find better strategies to prevent illegal immigration and fight against fundamentalism. This is the reason why we need to cooperate closely, to create job opportunities and allow people to settle in their own countries.

It goes without saying that we need a shared vision, a common policy to start a sound, fruitful and fair cooperation.

We need that choice to face common challenges and prepare the future in consideration of common interests and objectives for the enhancement of our fellow citizens' conditions of life.



We also have to assure the same prosperity and progress our society aspire to reach in stability and security.

Obviously such an objective is not only a governmental and institutional matter, but it also concerns our civil society, which strength lies on its inner differences, its shared awareness and, especially, on its capability to mobilise people's will and efforts.

In order to reach a high quality of life, we need to ban selfishness. In other words, when a neighbour country has to face problems relating to environment and sustainable development, we have to stop considering that it is not our business. All strategies and actions, then, should be fair and convergent, in order to favour this objective and make the Mediterranean sea achieving sustainable peace, stability and development

Fishery policies and the European Commission

Hon. ANTONIO BUONFIGLIO - *State Secretary Ministry of Agricultural Food and Forestry Policies*

Nowadays, fishery policies mostly fall within the European Commission competence. National states contribute to the identification of goals and policies and carry on a control action.

Generally speaking, it is nonetheless impossible to ignore the existence of several problems, mainly caused by the necessity of the Commission to promulgate directives that are suitable to regulate this topic in extremely different geopolitical situations, such as the North Sea, the Atlantic European coast and the Mediterranean area. In addition, European bureaucracy often finds it difficult to understand each single situation, such as the Mediterranean one.

Thus, it frequently happens that Mediterranean fishermen are hard pressed when confronted with a foreign fishing practice or management – as it is the case of regulations about the maximum height of gill nets.

Hence the necessity for the Italian government to support some kinds of traditional, non-excessive fishing practices at the European and international level, as these methods are meant to preserve fish resources.

These and other topics will play a major role during the 20th Conference of the Sea, which my Ministry will attend in an active, creative way.

Even if we have not witnessed any catastrophic effects on Mediterranean health – announced by several prophets of doom during the fifties and the sixties – it is clear that the productive potential of an appropriate fishing effort is strongly tied to the health of both our waters and the international ones. It is also clear that only by making targeted, shared choices will we be able to see positive effects – even more positive than those produced by Community directives.

My Ministry is particularly committed to international relations.

I'm extremely glad to see that Mareamico favours a joint assessment of environmental and structural aspects, for its approach is completely shared by us too.

A research contributing to peace

Hon. GIUSEPPE PIZZA - *State Secretary for Education and Scientific Research (MIUR)*

*The title **Mareamico** chose to celebrate its twentieth anniversary, "**Solidarity and friendship among Mediterranean countries**", at a first might sound like a political agenda, but truly represents the spirit of an atypical association strongly committed to improve relations among other Mediterranean countries and to pursue a shared engagement in order to solve common problems.*

Without any doubt, rational use of natural resources, the development of green technologies, sharing knowledge, common regulations are different aspects of the same issue: how to avoid further spoiling of common resources and granting a balanced development, new job opportunities and better living conditions, regulating migration flux in order to avoid anthropic unrest and support local activities.

Scientific research is objectively the core of all this activities both to preserve fish population and to grant growing technical educational levels, in addition it regulates and increasingly prevents different types of environmental pollution.

After signing a friendly agreement with the Republic of Libya and following both EU directions and UN strategic plan, Italy has confirmed to be fully available in supporting environmental programs (purification plants, waste material, etc) also taking in consideration the latest population migrations towards coastal areas. Such sites are becoming more sensitive due to an exaggerated anthropic pressure.

Cooperation programs will not be limited to environment but eventually will include cultural and scientific fields, (just think about ... the archaeological treasure under the sea) education –not only environmental- and scientific research. In such an international frame Italy has a prominent position due to its particular geographical, historical, and political situation and its traditional tendency to cooperate and interact.

Research concerns transportation and communication to promote better solutions, in building new infrastructures (see Libya) and in reorganizing trades.

Italy is determined to become a real "logistic platform" in the Mediterranean sea and a point of reference for the global maritime economy as one of the best sites for international shipping companies. In this perspective it is imperative to create a mutual strategic plan.

Workshops organized by Mareamico, an association registered in the research program promoted by the Department I represent, will provide very useful suggestions in this perspective as well. Also on behalf of Minister Gelmini, we will confirm our full support.

The Mediterranean: a Fragile Sea

Dr. FRANCESCO SAVERIO ABATE - *Director General of Fisheries and Aquaculture*
Ministry of Agricultural Food and Forestry Policies

*The decision taken by **Mareamico** to dedicate a day of reflection on the issue of fisheries and aquaculture on the occasion of its Conference on the Sea event, with a special focus on the state of health of the Mediterranean Sea, represents a specially noteworthy initiative.*

Among other things, this initiative contributes to performing a constant monitoring and continuous reflection on the ongoing developments and on the decisions to be taken both at domestic and international level. In the Mediterranean Sea alone, many tons of fish biomass are destroyed every year, thus producing an enormous impoverishment of aquatic biodiversity. This is also compounded by the continuous threat constituted by the pollution originating both on land (such as waste water) and at sea. This makes it necessary to strongly regulate fishing, not only to safeguard the economic and social survival of fishermen but also, and above all, to protect biodiversity as well as marine and coastal ecosystems, without which the entire professional fishing sector is doomed to inexorably become impoverished.

More specifically this Administration, with the support of several environmental Associations including Mareamico, has always concentrated its utmost commitment on the Mediterranean Sea with a view to putting a halt to non-sustainable and non-selective fishing systems such as indiscriminate driftnet or trawling fishing practices.

The intervention of the General Directorate for Fisheries and Aquaculture, aimed at safeguarding the Mediterranean's marine and coastal environment, has always been multi-faceted in nature: collaborating in establishing marine protected areas, establishing areas of biological diversity conservation, launching information and training projects for sea workers and, last but not least, providing sizable economic support for the reduction of the fishing effort.

Moreover, its effort can acquire an even greater significance if it is matched by an equivalent effort on the part of all the States bordering on the Mediterranean Sea. The ambitious target of involving all the Nations concerned in a joint effort to achieve a protection programme that might extend beyond national and European boundaries in singling out supra-national habitats and projects, would represent an important step forward in the pursuit of a common sense of belonging that must necessarily pervade the relationships between Mediterranean States. Indeed, the environmental sustainability of the sea and the conservation of the quality of marine landscapes and environments represent a common path to be pursued within the multi-lateral context existing between the European Union and the Third Countries bordering on the Mediterranean Sea, as well as the principal way of guaranteeing a peaceful coexistence and a sound and durable development throughout the region.

This is the philosophy that inspired the establishment of fishing districts, with the aim of managing biological resources according to the principle of sustainability, as marine areas are homogeneous from a social, environmental and economic point of view.

Moreover, besides differentiating sources of income through fish and fishing tourism and angling, fishing districts can also promote tourism as well as other economic activities associated with fishing. Another relevant aspect is that fishing districts offer an opportunity of integrating the fishing production chain with other production sectors (transport, tourism, crafts, and the SMEs operating in different production sectors, etc.).

The environment: a challenge for Europe ... and for the whole planet

Dr. CORRADO CLINI - *General Director Ministry of Environment, Territory and Sea Protection*

The present crisis affecting the whole planet, Europe and, undoubtedly, Italy has imposed an overall rethinking of governmental policies and actions. The European Union has also been involved in such a process and yet the two main challenges that Europe has to tackle have not changed.

On the contrary, these major issues have become functional to the recovery; on the one hand, it will be necessary to grant sufficient energy levels and, on the other, a global reduction of CO^2 emissions, in keeping with the objectives established by the Kyoto protocol and the following agreements.

The European Union has adopted rather ambitious goals aiming at reducing greenhouse gas emissions, exploiting renewable sources of energy - especially bio fuels - to meet primary needs and increasing energy savings through efficiency measures in all sectors. In order to fulfil such objectives, equally ambitious domestic policies have to be implemented and international cooperation relations have to be established with neighbouring countries, including those characterised by a lesser level of development.

It is in such a context that a real Euro-Mediterranean cooperation framework in the energy sector has become of paramount importance. In this region, both efficient energy technologies and renewable sources of energy are available. Therefore, consistent actions are taken in view of developing such sources and decreasing greenhouse gas emissions.

*Mechanisms such as the **Clean Development Mechanism** issued from the Kyoto Protocol or the renewable energy trade certificate scheme are already in place; if they were further developed, they might contribute to support investments in this sector.*

It goes without saying that, in order to reach such goals, it is necessary to conceive and implement shared development programmes to be applied in conjunction with environmental protection measures, especially in sensitive areas such as the Mediterranean.

This is the direction finally undertaken by the European Union and many domestic Governments, including Italy, both by strengthening the traditional friendly cooperation relations and by starting new ones, as has been recently the case with the agreement signed with Libya.

The Mediterranean pollution reduction programme of UNEP: from an idea to concrete action

Dr. FRANCESCO SAVERIO CIVILI - *Coordinator MED POL Programme Mediterranean Action Plan of UNEP*

The Mediterranean marine environment has for long been subjected to considerable stress as a result of pollution caused by human activities. The greatest part of this pollution, around 80%, originates on land and is linked primarily to population pressures, urban growth, industrial and agricultural activities. Aware of that, in 1975 the United Nations Environment Programme (UNEP) supported the creation of a specific programme for the Mediterranean region, the ***Mediterranean Action Plan (MAP)****, aiming at the reduction of marine pollution.*

The programme was one year later (1976) fully supported by the bordering countries and the European Union and a number of legal texts were signed to make the programme more effective. The texts included the ***Barcelona Convention*** *and six Protocols, among which the Protocol on Land-based Sources of Pollution to regulate all the pollution activities on land. Since then, the major sources of pollution have been identified and gradual measures have been taken.*

One of the major recent MAP achievements in the struggle against pollution from land-based sources was the formulation and adoption by the Contracting Parties of a Strategic Action Programme (SAP) to address pollution from land-based activities. The SAP, prepared by the MED POL Programme, that is the pollution reduction component of MAP, is the basis for the implementation of the Land-Based Sources (LBS) Protocol by the Mediterranean countries in the next two decades. It is an action-oriented initiative identifying priority target categories of substances and activities to be eliminated or controlled by the Mediterranean countries within a set time frame. The reduction and phasing out targets are formulated in harmony with related regional and international Conventions and programmes, such as the EU Directives, policies and strategies and the Stockholm and Basel Conventions. The key land-based activities addressed in the SAP are linked to the reduction of municipal and industrial pollution.

Concerning municipal pollution, the central and direct role of the Governments in the mitigation of this type of pollution (i.e. through the construction of sewage treatment plants) was recognized when planning the activities, while the SAP's contribution was expected in terms of technical assistance such as guidelines for the construction of treatment plants, capacity building for their operation and maintenance. Regarding the reduction of industrial pollution, with the effective involvement of government experts and other stakeholders, an inventory of all emissions and releases of pollution sources and substances, known as the "national baseline budget of emissions and releases", with 2003 as the base year, was prepared, tested and developed.

This inventory, updated in 2008, now represents the starting point from which the reduction in terms of percentage of pollutant inputs will have to be achieved according to the targets and timetable of the SAP. After the adoption of the SAP, the Global Environment Facility (GEF) approved a ***Medi-***

terranean Project *(2001-2005) entailing a contribution of six million US dollars for the implementation of a number of activities on the ground.*

The project attracted other donors such as the Fond francais pour l'environnment mondial (FFEM), providing for an overall budget of 12 million US dollars. The major contribution of the project was the preparation of National Action Plans (NAPs) to address land-based pollution by all the bordering countries. The NAPs, formally endorsed by the ***13th Meeting of the Contracting Parties*** *held in November 2005 in Portoroz, describe the policy and the actions/interventions by each country to reduce pollution in line with SAP targets, including technical and financial means and deadlines.*

The countries made use of all the background work carried out in the framework of MED POL (guidelines, technical and policy documents, capacity building programmes), as well as of all the data and information gathered during the process such as the data and figures of the baseline budget of emissions and releases.

An innovative approach used in process has been the full involvement of all stakeholders. In each country, the national and local authorities, the industrial sector and NGOs sat for the first time around the same table discussing priorities, possible measures and opportunities for investments. During the consultative work carried out, it became very clear that the NAP implementation process, with its embedded mechanisms for exchange of information, promotion of use of cleaner technology, transfer of technology, public participation and sustainable financing, will enhance economic, technological and social development at the local level, thus making a concrete contribution towards sustainable development.

For this reason, the successful process of preparation of the NAPs has again attracted the attention of the international donors and, as a result, a new GEF Strategic Partnership including a large number of International Organizations as well as the World Bank has been launched to support the long-term implementation of NAPs. Very positive prospects also lie in the expected synergy with the new EC ***"Horizon 2020"*** *initiative with very similar pollution reduction objectives and targets for the Mediterranean region. In fact, the pollution reduction component of the Horizon 2020 takes into full consideration the NAPs and the findings of MED POL and, as a result, has launched a full programme in cooperation with the European Investment Bank (EIB) for the financing of a number of priority pollution reduction interventions directly deriving from the NAPs.*

About 44 pollution reduction interventions have been selected for loans and grants that, when implemented, will result in a concrete and measurable reduction of the pollution in the Mediterranean. In conclusion, the efforts of the United Nations Environment Programme are resulting in an effective programme of pollution reduction in harmony with the European Union objectives and regulations and in cooperation with the large international financial institutions such as the GEF, the World Bank and the European Investment Bank.

That means that the initial idea of UNEP of putting together countries of different levels of development, of different cultures, religion and traditions, around a common table to discuss and act on a shared issue, i.e. the marine environment and its conservation, was finally valid and is giving now its positive results for the benefit of all Mediterranean populations.

Parliamentary friends of the Sea Association

Hon. MAURO CUTRUFO - *Vice Mayor of Rome and President of Parliamentary friends of the Sea Association*

*The **Parliamentary Friends of the Sea Association** is happy to renew its approval and involvement in this event, the 20th edition of the "Conference on the Sea" promoted by **Mareamico**. Again it sees the Mediterranean as being at the centre of attention, with the question of its environmental protection within the framework of economic growth.*

It deserves our praise, and in particular Mare Amico and its untiring President Hon. Roberto Tortoli's work in raising public awareness and developing effective discussions among the countries bordering on the Mediterranean Sea.

And the Parliamentary Friends of the Sea Association can only confirm their own involvement, ratified last year by a protocol of agreement.

I believe I should stress particularly the political and scientific contribution of our ally, Tunisia. The path we have chosen, which involves dialogue, will bring fruitful results and ever greater involvement and participation on the part of other coastal countries.

The Parliamentary Friends of the Sea Association, which has been working indirectly and above party politics since 1982, will continue to play a role in the formation of national legislation, gathering inputs from the scientific analyses made by various organisations involved in it.

Up to now we have taken many practical initiatives in favour of the sea. The first came with the approval, in the course of the last legislature, of the only organised body of law on the sea and seafaring.

And already, since the beginning of the present Legislature, the Association's experts have been taking stock of the situation and drawing up an agenda of proposals which have recently been put into practice in the form of amendments to the financial act. Furthermore, it has worked together with other organisations in the sector.

The Association is now active on various fronts. Firstly, the "Sea table", with a very full agenda of commitments aimed at solving the serious problems of harbours. On this subject it has brought a bill before Parliament on tourist marinas. The aim of this is to devise a specific plan for the protection of the sea and its coastlines, taking into consideration the climatic changes taking place on our planet.

Hon. Cutrufo together Hon. Pino Lucchesi in the XVII Conference on the Sea

A few words by Mayor of Rome GIANNI ALEMANNO

The City Council of Rome has enthusiastically accepted the proposal made by Mareamico to hold the twentieth Conference of the Sea inaugural meeting at the Capitol. This will also be the perfect opportunity to rightly celebrate the twentieth founding anniversary of the association, which is today chaired by my colleague and friend, MP Roberto Tortoli, former State Secretary for Environment, now Vice-chairman of the Lower House Environment Committee.

The action encouraged by Mareamico to strengthen collaboration, solidarity and friendship between Mediterranean countries seems to confirm the long-lasting message of culture and peace emanating from the Eternal City. Besides, it is worth mentioning that the bishop of Rome, the Pope, St. Peter's successor resides in Rome.

Municipal authorities are engaged in the same direction, as shown by many of its present and future initiatives.

***Mareamico** activities will be characterised by the presence of politic, cultural, scientific and academic personalities. This will be an opportunity to discuss topics of common interest such as environment and ecosystem protection. Experts will contribute too, which will give these discussion the possibility to offer messages, trends to be followed and a shared anthropocentric, reliable view.*

On behalf of municipal authorities, I wish to friendly welcome all of our guests, and I also wish them a good job.

A few words by Mayor of Fiumicino MARIO CANAPINI

It is always with great pleasure that I take part in initiatives aiming at promoting the debate on such crucial topics to our community. For this reason I would like to thank ***Mareamico****, for in the last twenty years it has played a major role in the protection of one of our most fundamental resources – and I am talking about the sea.*

I would like to thank the new president, Mr. Roberto Tortoli, for his passionate devotion to the association which, I am sure of that, will achieve more and more important goals. I also offer my thanks to the honorary president, Mr. Pino Lucchesi, who has already achieved fundamental goals as for sea resources protection.

A special mention goes to Mareamico steering committee, for its day-to-day excellent job and the constructive projects it proposes to institutions. Another mention goes to the scientific committee, for its steadfast commitment in support of such vital topics to our society. These are technical documents, allowing us to have more and more useful tools elaborate proposals – the fact that these are also biocompatible and eco-sustainable means that they contribute to the protection of our natural resources.

Protecting the environment means protecting ourselves, too. Everyone can play an important role in this project, which must concern the land, the sea, and the whole underwater world.

Our city has always been aware of the importance of knowledge. This is the reason why a project has been prepared in collaboration with the Italian Geographical Society, the publishing house Media Press and a staff of expert from Sapienza University of Rome. The goal of this project was to make the most of our sea "hidden treasures", like the underwater ecosystem off the fishermen village, near Fregene. This is but an example, however it confirms that it is possible to achieve a certain degree of development just by increasing the value of our natural heritage.

It is towards this direction that the initiatives of Mareamico are pointed. They are thus even more precious in a society favouring too hurried choices. For this reason, in behalf of the whole city, I would like to thank Mareamico once more.

CASA DELLE REGIONI DEL MEDITERRANEO
A Regional Foundation to relaunch the Euro-Mediterranean dialogue

Sen. MICHELE ACHILLI - *Director General of the Casa delle Regioni del Mediterraneo Foundation*

The Casa delle Regioni del Mediterraneo Foundation, a non-profit organization established at the end of 2006 upon the initiative of Mr. Pietro Marrazzo, the President of the Region of Latium, was conceived as a nimble structure capable of becoming a flexible instrument of the office of the President of the Region during the design, coordination and implementation of cooperation initiatives promoted by the regional political and administrative Institutions of the Countries bordering on the Mediterranean.

Historically speaking, Latium has long been the fulcrum of the events that changed the history of the peoples living along the shores of the Mediterranean. In modern times and especially in the course of the last decades, Latium and Rome – for many centuries rightly considered a sort of caput mundi, and not only by its inhabitants – have once again become a living laboratory for experiences conducted in the economic, social and cultural fields.

An advanced society with consolidated democratic traditions, such as the one of Latium, can make a major contribution towards the establishment of a common "home" within the Mediterranean area. Although, for the time being, it is only a virtual building, it is nonetheless irrefutably gradually taking on a political consistency; an ideal place in which people can meet, overcoming their linguistic differences and the diversity of their religious beliefs, with the aim of building together their present and future.

The Casa delle Regioni del Mediterraneo – only a short while after its constitution – is already committed to establishing a network of international relationships, synergies and partnerships capable of enabling, should the required financial and human resources prove to be sufficient, the realization of ideas and projects of considerable interest for social groups, Institutions and Administrations on the different shores of the Mediterranean.

The work of the Foundation is characterised by designing the events from the perspective of common interests and it is precisely this approach that was taken in planning important cultural cooperation projects such as "The rebirth of the Library of Alexandria and the participation of Italian national libraries in the inter-Mediterranean cultural dialogue", which was launched in 2008 and is still underway, the partnership signed with the Università degli Studi Roma Tre – Centro "Altiero Spinelli", the Foundation's relationship with the "Anna Lindh Foundation for dialogue between cultures", as well as with the Ministry of Foreign Affairs and the Ministry for Cultural Heritage and Activities.

The issues addressed by the Foundation are absolutely heterogeneous but their common denominator can be found in the topicality of the problems and themes currently affecting the Euro-Mediterranean regions. We are especially interested in the perspectives laid down in

the project of Union for the Mediterranean, the cultural and political dialogue between cultural Institutions and men of culture who experience different political and social situations in different regions of the Mediterranean area, the complex problems connected to commercial communications and trade, the migratory flows that are now such an extended issue of debate, the climate change and the now well visible consequences on people's lives, the transport system, the merchant routes and the exploitation of all sorts of resources that need to be utilized for the good of all peoples and not only of privileged classes and Nations.

In tackling some of the problems arising from these issues, the Casa delle Regioni del Mediterraneo Foundation cannot but take into consideration the experience acquired by the Mareamico Association, technically and scientifically directed by some of the most representative personalities of the world of politics and research in Italy. Mareamico has the capacity of creating cultural and political synergies at both national and international level and of suggesting and implementing solutions for some of the most topical issues associated with the sensitive and often fragile relationship between Man and the environment. The relationships between the Casa delle Regioni del Mediterraneo Foundation and the Mareamico Association only date back to a very recent past; we therefore wish that they be long-lasting and profitable for both parties, like any relationship based on complementary competencies in the performance of a joint effort aimed at the achievement of converging objectives.

Villa Piccolomini house of the Foundation

The role of Mareamico in the cooperation among Mediterranean countries for marine environment protection and development

Prof. GIUSEPPE COGNETTI - *President Scientific Committee of MAREAMICO - University of Pisa*

*The **Mareamico Association** celebrates this year its 20th anniversary. Its task is to favour discussion on marine environment protection and improvement, between political institutions and entrepreneurial structure on one side and scientific world on the other, in a framework of international collaboration. During past years, Mareamico has always respected this engagement, strengthening more and more cultural and scientific relations with Mediterranean countries, thanks to a highly qualified International Scientific Committee. This cooperation has been characterised by several meetings, congresses and round tables on pollution control, biodiversity protection, trans-boundary parks, ecotourism, fishing, environmental education and harbours.*

In this framework, several initiatives have been organized, for example the twinning, ratified in 2005, between Tunisia Natural Sciences Society and Mareamico, in the presence of the Minister for Quality of Life, Mohamed Mlika, and the Minister for Environment, Altero Matteoli. This has favoured a closer scientific collaboration and knowledge exchanges between the University of Pisa and the University of Tunis. Further initiatives relate to the establishment of a direct and closer scientific collaboration with Montenegro. Actually, last event was an international scientific congress in Budva in 2008.

*In the same year, Mareamico favoured advertising, communication and spreading of the **INTERREG** project, concerning transitional waters, and involving French, Spanish and Greek partners.*

In order to continue this policy, the XIXth Conference of the Sea was organised in Tunis, at Tunisian government's invitation, with the collaboration of Sicilian authorities, the fishing Productive District of Mazara del Vallo, the Ministry of Agriculture and the Association of the Mediterranean Network for Sustainable Development, which Mareamico is an active member of. This Conference allowed a valid discussion among delegates from Italy, Malta, Tunisia, Libya, Egypt and Jordan. The result was the establishment of important agreements relating to fishing, sea farming and professional training.

Therefore, Mareamico is an environmental association which not only awakens public opinion to marine environment protection, but also tries to get concrete results. Such results can only be achieved through proposals based on scientific rationales and through closer relations between science and politics at national and international level. The XXth Conference of the Sea, organised in Rome for the first time, aims at intensifying collaboration at all levels in a spirit of solidarity and friendship among Mediterranean countries. The relations between economic activities and environmental compatibility are highlighted by the topics of the Conference. We are aware that in the Mediterranean area, where political boundaries do not correspond to the ecosystem ones, environmental protection has to be matched with many economic interests. It is, therefore, necessary to grant a closer relation between scientific research and productive activities.

The Coast Guard - Port Authority and environmental protection

Admiral RAIMONDO POLLASTRINI - *Comandante Generale Corpo delle Capitanerie di Porto*

In a Country that boasts an eight-thousand km coastline and an unparalleled natural, cultural and artistic heritage, the marine and coastal environment is of a paramount strategic importance which needs to be managed by highlighting its potential in terms of protection but also environment-friendly development.

The Coast Guard - Port Authority has always focused its activities on the control and protection of coasts and the sea, of all its resources. Given its deep and established experience in the field of the marine and coastal environment, the Ministry of the Environment and for the Protection of the Territory and the Sea has decided to use the Coast Guard - Port Authority– since its establishment – as the operational tool of the implementation of the protection of the Marine environment.

It is the intent of the Legislator to put the Coast Guard - Port Authority at the center of the activities to protect the marine and coastal eco-system. Indeed the specific role to which the Corps has been entrusted combines the functions of safety of navigation and protection of human life at sea and the activities of protection of the marine and coastal environment from pollutants.

Following the D.Lgs n. 152 of April 3, 2006, regulating the ***"The environmental matter"*** *and particularly articles 135 and 195, providing for special competences of the Corps in relation to the management of prevention activities and investigations on crimes and wrongdoings in the field of water protection from the pollution and putting down of unlawful exchanges and illegal waste disposal, the Corps performs two primarily important functions. These are added to the existing functional competences on environmental matters that result from the Law on sea protection n. 979 of December, 31, 1982 as well as Law n. 394 of December 6, 1991 on protected marine areas and Legislative Decree n. 182 of June 24, 2003 entrusting the Corps with inspection and police functions on matters of waste collection on ships and cargo residues, in order to prevent their disposal in the sea.*

The Special Investigation Unit - NSL - was established by the Coast Guard - Port Authority together with the Unit for the Marine Environment, reporting directly to the Ministry of the

Environment and for the Protection of the Territory and the Sea to implement the operational guidelines and tasks set by the Minister to give a faster and more effective support to the implementation of institutional functions on environmental matters.

In this framework, the activities carried out by the Coast Guard - Port Authority, within the field of the protection of the environment, are diversified and highly qualified, thanks to the fundamental support of its naval-aviation, submarine and ground forces whose members are increasingly professional.

Briefly, the tasks of the Corps in the field of the environmental protection follow these guidelines:

- *an intensive activity of protection of marine protected areas, of research areas and/or areas to be, as well as any other costal area of a particular environmental sensitivity;*
- *the control on territorial waters and other sea areas subject to particular environmental restrictions*
- *monitoring the waste disposal system on the land, at sea and in ports;*
- *monitoring maritime traffic and inspections on the national fleet and at least 25% of foreign ships calling at national ports in conformity with the "Memorandum of Understanding on Port State Control", to verify the exact conformity with the obligations on the minimum safety standards concerning the marine environment (Safety);*

- *monitoring the emission of pollutants in the atmosphere by ships;*
- *protecting marine fauna under special protection;*
- *monitoring and protecting the marine environment under the terms of the International Marpol Convention 73/78, as well as other international and community conventions and regulations;*
- *fighting against and preventing the pollution from hydrocarbons and other toxic and harmful substances and promoting the safety of the marine environment and ports areas (Security);*
- *the implementation of actions in case of marine pollution of territorial waters and offshore;*
- *controlling the disposal in the sea of waste coming from the land by ships, aircraft and platforms;*
- *monitoring, controlling and eventually punishing the handling and disposal of oils, batteries, exhausted filters in ports;*
- *monitoring the marine coastline owned by the state in order to prevent and eventually punish any kind of unauthorized activity or alteration, unlawful or jeopardizing activity and exploitation of environmental resources also in view of the implementation of the foreseen reintegration and compensatory activities by the State.*

The goals and the results achieved are the basis to trust the potentialities and abilities of the Coast Guard - Port Authority thanks to which the Authority will count on real professionals entrusted with the protection and control activity on the marine and coastal environment by the State.

Solidarity

Hon. PINO LUCCHESI - *President of Ce.n.i.s. (National Center for Social Initiatives)*

A very thin link is connecting experiences, stories, and relations.

This is what happened, and keeps happening to me today, even if I no longer have a primary role in the Association, I am still one of the founding members. My mind is reviewing years of difficulties and stress, beautiful moments of friendship and solidarity, men and women faces, each of them with a different story, sensibility, political and religious creed, but all of them sharing the same commitment to help others, to provide useful suggestions and create true relations.

How many times I heard people telling me: "Well, all of you are always talking about the same issues, and often you are just talking to each other, like a close congregation gathering every once in a while, simply celebrating your own rites."
How many times I found myself thinking other Associations -more entertaining than us- might have been doing a better job in organizing parties and promotional events, while Mareamico was still represented by old fashion looking and obsolete personalities, expecting they could give suggestions to politicians…

It was inevitable for my role to be changed, but I am still strongly motivated to offer my help anyway. Today I am looking at the past to analyze delusions and arguments, misunderstandings and disappointments. When trying to weigh the pros and cons during my years in office, it is very rewarding to acknowledge relations constantly growing, the successful enterprise of traveling events, international conventions (organized in Tunisia, Malta, Montenegro), our contribution to EU projects, often cooperating with the most prestigious Italian and foreign universities, our young "environmental ambassadors" commitment, our mission statement (a little "DeGasperi style", I have to admit….): only if we are united we can face the great challenges, but being united means each and every one of us must contribute according to his own skills and provide personal experience and suggestions.

Organizations such as Mareamico, free from bonds and influences, have in front of them an ocean of opportunities giving their contributions, correcting mistakes, focusing on common goals, never forgetting Man is the nucleus of the Creation. This is not excusing us from responsibilities and commitments, particularly in passing on to new generations an healthy environment full of potentials and opportunities, not only job related. In my perspective, the perfect combination between a political view and the scientific approach is the best legacy for our new President, Mr. Roberto Tortoli, who I'm willing to give my full support. Only our strong hope and faith in human skills, which will be able to improve positive behaviors, can lead us out from this difficult times of economical crisis and loss of moral standards.

I am sure Mareamico will provide its factual contribution.

Tourism and Sea: economic need and sustainability

Prof. JEAN-PIERRE LOZATO GIOTART - *Director of Research University of Paris III - Sorbonne Nouvelle*
National Commission for Tourism Quality

Tourist activities involved more than 850 million tourists on 2008. in the same period the tourist industry would have gone beyond 10% of the international commercial GDP with 220 million workers.

The economic incoming deriving from tourism is really necessary for several countries and destinations, such as Seychelles and Maldives and for big tourist countries, such as France, Italy or Spain.

Nevertheless, according to the kinds of economic, environmental and human impact, how can we match these aspects with sustainability, in marine areas in particular?

Today it seems recommended to use Applied Engineering specific indicators in maritime tourism, as the sea is still the first tourist destination in the world.

In conclusion, challenge of economic and environmental sustainability, underlined by climatic change, means that maritime protection also involves the protection of tourist activities.

MAIN MARITIME TOURIST ACTIVITIES

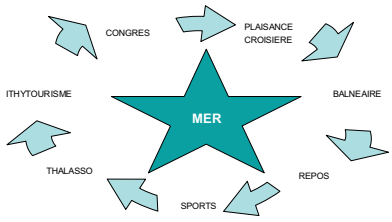


Figure 2: Main maritime tourist activities

MALÉARES, SEYCHELLES : COHERENT POLICIES

Baléares	Seychelles
Coast protection	Carrying capacity
Hotel distruction	Water/energy saving
Valorisation of ressources	Finantial limitation

Figure 3: two leading examples: Baléares and Seychelles

SEA AND COAST: +50% OF TOURISTS (2007)

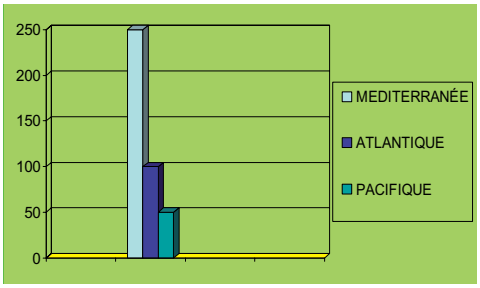


Figure 1: distribution of tourists per maritime areas

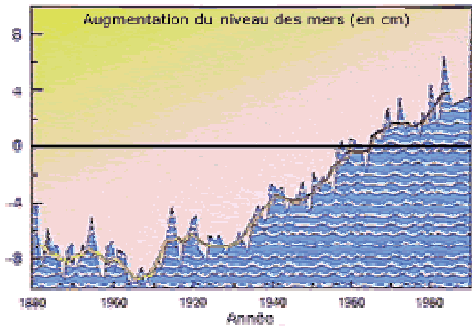


Figure 4: Global warming and raising of the average level of seas.

Pleasure boating and marinas, between development and environmental protection

Dr. FRANCESCO VALENTINI - *Vice President of MAREAMICO ASSOCIATION*

Despite claims that Italians are not a "population of sailors", it is instead a proven fact that Italy is probably the Mediterranean Country that records the highest number of pleasure boats *(broadly intending, with the use of this generic term, both the boats that are registered in public registers and those that are not)*.

The data relative to the domestic market during the last ten years have recorded a gradual uptrend in the sale of motor-boats *(especially with outboard motors)*.

It is obvious that the recently sparked global financial and industrial crisis, with an inevitable fall-out also on our Country, is bound to produce a slackening of the sector's production activities over a given span of time but it is also a fact that, as with any economic cycle, a recovery will take place sooner or later.

By then our Country will have to be prepared in terms of a far-seeing development strategy for the sector. Said strategy shall have to primarily focus on developing marinas and landfalls for pleasure boats. It should be immediately specified that developing the sector's traffic capacity should not be intended as an unbridled proliferation of dedicated harbours *(so-called "marinas")* but mainly as the intelligent utilization of the docking areas of minor harbours *(regional ports)* which tend to the needs of pleasure boating activities in terms of providing berths and essential support services.

It would be advisable to have prudent sector-specific planning policies, especially if jointly developed by Regional and Municipal Authorities. Developing traffic capacity in terms of infrastructures and services is the essential prerequisite for the development of nautical tourism, especially if linked, wherever possible, to cultural itineraries on land, of which our Country offers a wide range of options.

From this point of view, would it perhaps be slightly far-fetched to think, for the immediate future, of a computer network linking all the tourist ports and landfalls that might provide real-time information on the availability of berths, fees, ground-based services and a choice of cultural itinerary options? Lastly, the construction of new marinas and landfalls can obviously only take place in full compliance with landscape and environmental conservation policies. From this perspective, it becomes essential to perform environmental impact assessments not merely aimed at frustrating innovative initiatives but at reasonably reconciling the legitimate socio-economic development needs of a region with the need to safeguard its marine environment and coastal landscapes

Eco-friendship and costal infrastructures. ASSOMARINAS: "Stainless" tourist harbors where there is room for improvement...

Dr. ROBERTO PEROCCHIO - *President of ASSOMARINAS - Italian National Association of Ports*

Harbours will be bluer and bluer following law 182/2003 - *on harbour plants for the disposal of waste produced by ships and cargo residues* - following European Directive 59/2000, which imposes specific non-hazardous and hazardous waste disposal plans to moored boats.

Most of the Italian harbours have already implemented their waste disposal plan under the terms of law and following the requests by the organization called "Bandiere blu" of the F.E.E. *(Foundation for Environmental Education)*. However nautical users are still to understand the importance and size of the required investment and the fact that it affects the final cost of mooring services. Besides, the enforcement of the relevant sanctions, as provided by the law, is far from being applied to impolite yachtsmen.

It is also true that the Marine Authority has been concentrating its attention on these issues to increase the protection of marine environment quality while some positive effects of these new regulations are already felt with the increase and organization of separated collection with construction site areas free from toxic waste, with the implementation of the so-called *"environment-friendly areas"* and with the efficient usage of bottom washing waters.

That is the beginning of a cultural growing process that is implemented and monitored nationwide by ASSOMARINAS not only through the organization of courses and the participation in training conferences for port workers, but mostly through the enhancement of the best practices already adopted by more jammed tourist ports both in the north and the south of Italy to turn the Italian *"marine stay"* into a more pleasant stay for users.

Touristic harbour of Porto Cervo

Mediterranean fishing

Dr. MARIO FERRETTI - *Centro Italiano Ricerche e Studi della Pesca*

Mediterranean fishing is going through a period of important changes.

During the last years fishing management has switched from domestic governments to the European Union. As for Italy, several tasks have switched from the Ministry of Agriculture to regional bodies.

Fishing has, thus, to coexist with such changes, and often with difficult problems and adjustments. Actually, EU management does not fit with the characteristics of our resources, our sea, our fleet, our traditions. An example is in regulations which often are inaccurately translated and based on a senseless philosophy, unless, perhaps, if we consider contexts such as the Atlantic Ocean or the North Sea. For us such regulations are, in fact, inapplicable and sometimes it is difficult to understand them.

These directives claim to regulate even fishing details, in fact they are inapplicable, as we are not provided with the instruments to enforce them, either with experts who can make such detailed control. Often our small fishing boats doing inshore fishing are considered as bigger boats doing offshore fishing. Small fishing boats are often asked to obey too strict regulations, which cannot be obeyed because of the size and the crews of boats. An example is the obligation of having an electronic log-book on board for more than 10 metres sized fishing boats.

On the other hand, regional management is not perfectly organised yet, as some maritime regions are not provided with enough staff, able to cope with complex fishing problems.

In such a confused context, characterised by incomprehensible, inapplicable or contradictory regulations, fishermen's life becomes really difficult. Sometimes they do not understand, and they cannot even be helped to understand, whether they are fishing legally or not.

In order to define legal fishing limits, it would be necessary to reduce the number of regulations and eliminate differences between EU legislation and national and regional regulations.

In the present situation it is even difficult to understand whether some activities are legal or illegal, not only for fishermen, who are called to obey the law, but also for operators often giving different interpretations of the same regulation. A regulation to stop illegal fishing has been recently enforced, but, in order to obey it, we have to know without any doubts what is forbidden and what permitted.

The effects of harbour traffic on air quality (the case of Venice)

Prof. FRANCO PRODI - *Director ISAC-CNR*

The emissions arising from the moving and mooring of ships in harbours contribute to deteriorating the air quality of coastal towns. Consequently to the rise in maritime commerce and tourism, the transport of goods and passengers through harbours has increased and will continue on an uptrend in the future. This is why particular attention should be focused on the problem of the effects of pollution in harbours on the surrounding anthropic ecosystem. This impact is very high in large harbour cities and/or lacustral or lagoonal wetland areas, precisely like that of Venice.

The Harbour Authority of the Port of Venice, together with the Institute for the Dynamics of Environmental Processes of the National Research Council of Venice, have commissioned a study targeted on estimating the emissions originating from the transit and mooring of large ships in the harbour *(Stazione Marittima)*. This study is focused on measuring high temporal resolution aerosol particles *(PM2.5)*, Polycyclic Aromatic Hydrocarbons *(PAHs)*, heavy metals *(with a 24 hour sampling frequency)* and SO^2 and NO^2 Exhaust gas Flow Measurements *(EFM)* from ships sailing along the Canale della Giudecca. The transit of ships along the Canale della Giudecca, which is roughly 8 km long, raises serious problems because the traffic of ships, whether of small, medium or large tonnage, affects the overall pollution levels in the city of Venice, in addition to other problems connected to the visual impact produced by the transit of large passenger ships, which creates a feeling of alarm among the inhabitants of the lagoon City.

The results of the study carried out indicate a higher estimate than that of the direct immissions of the different pollutants measured that is due to the summertime traffic of passenger ships in the port of Stazione Marittima, which amounts to 14%-15% for PM2.5, 10% for PAHs, and 15% for nitrogen dioxide. This estimate was obtained taking into consideration the mean relative increase in PM2.5 concentrations due to the sources present in the NW-NE direction *(Stazione Marittima)*. An estimate factoring in the transit of ships in addition to wind-direction factors, indicated a 7%-8% increase in emissions.

An evident correspondence was observed between mean daily PAH concentrations in a “gaseous” phase and the tonnage of ships when the ground monitoring station was placed “downwind” from the Stazione Marittima port, which means that they are directly affected by emissions arising from harbour activities. As for heavy metal samples, no correlation was found to be directly connected to nautical traffic.

As already mentioned, an estimate was made of the direct contribution to immissions of fine-grain particulate. The formation of secondary particulate matter deserves particular attention. Secondary particulate refers to the particulate produced by the gas-particle conversion processes of principal precursors such as nitrogen, sulphur and ammonium oxides.

Even if the reactions regulating the particulate formation processes are very complex, the conversion times are rather. This means that secondary aerosol, arising from the conversion of the gases emitted by large ships, and of sulphur dioxide in particular, are very unlikely to occur in proximity of the source *(in this case, the port of Stazione Marittima)* but rather at greater or smaller distances, according to the transport of air masses due to meteorological conditions. This is particularly evident in Venice where, during the summer season, there is a well-defined breeze pattern.

This is the reason why similar studies estimating the ship-related effects on the quality of air, in the area surrounding their area of transit or of mooring, do not account for secondary aerosol particles.

An estimate of secondary aerosol particles arising from large ships, as from other sources, can be obtained through the use of dispersion models *(coupled with meteorological models)* that take into consideration the chemical reactions that lead to the formation of aerosol particles, or of models based on the emission budget of different pollutants, providing for the required gas-aerosol conversion factors.

In order to estimate the SO^2 and NO^2 gas emissions, expressed as mass, released by ships when transiting along the canal, we have relied on a new methodology called MaxDOAS, which is based on a number of remote-sensing measurements of the dispersion of solar radiation on an ideal vertical plane across the ship's plume.

Remote-sensing measurements are the basis for the estimates of SO^2 e NO^2 gas emissions due to the traffic of large ships, which account for roughly 30% of total traffic in the Canale della Giudecca. This value is extremely interesting as the emissions released by large and medium-sized ships can be further reduced by using a low sulphur fuel, which is not yet mandatory by law, in order to reduce SO^2 emissions, or by applying the best available technology *(BAT)* in combustion processes in order to reduce NO^2 emissions *(as was observed in the measurements taken during the transit of a few large ships that already use low sulphur fuel and/or have installed engines fitted with BAT)*. Both of these measures are more readily implementable and controllable on large ships than on small ones.

Lastly, the results obtained through the use of remote-sensing techniques in monitoring the mass of pollutants released by the comprehensive transit of ships in the Canale della Giudecca, confirm the effectiveness of the method proposed, which does not require direct interventions and enables the performance of relatively easy and quick measurements, to the extent that we are led to consider proposing them also for inspection purposes.

Contamination levels of persistent organic compounds in some fish species of commercial interest from four different Italian regions

Prof. SILVANO FOCARDI - *Department of Environmental Sciences, Università degli Studi of Siena*
Dr. MONIA RENZI - *Centro Ricerche Ecologia lagunare, pesca ed acquacoltura (Ecolab), Polo Univ. Grossetano*

The Stockholm Conference (1972) defined sea pollution *as the introduction of substances or energy into the marine environment arising directly or indirectly from human activities, producing adverse effects such as human health hazards, hindering marine activities such as fishing, deteriorating the quality of water and reducing the tourist attraction.*

At present, roughly 136 million persons living along the coasts of the Mediterranean pour out pollutants of different origin into the sea thus determining considerable levels of contamination that are also favoured by the scarce recirculation of water that characterises this basin *(Clark, 1997)*. Not only does the marine ecosystem accumulate the major man-made environmental contaminants but it represents the way into the trophic chain. In fact, chemical compounds can be transferred into the biological component through bioconcentration, bioaccumulation and biomagnification processes.

The intensity of these phenomena depends both on environmental factors and on the chemical-physical properties of the substances themselves *(Bacci, 1994; Focardi et al., 1998)*. The quantities accumulated in the tissues of marine organisms result to be higher or lower also in relation to the length of exposure, to the level of environmental pollution and to the tropic level of the species considered.

This makes it essential to exclude the possibility that edible tissues of fish species of commercial interest contain levels of contaminants that might be potentially hazardous for human health.

The Department of Environmental Sciences of the University of Siena has long been focusing its attention on these topics and has also developed projects aimed at estimating the human health hazard deriving from the consumption of fish products. Within the framework of the **MOMA[1] Project**, the Siena-based Operating Unit assessed the levels of persistent organic chemicals in fish species of commercial interest from four fishing areas located in the Regions of Apulia, Tuscany, Emilia Romagna and Veneto with a view to defining whether the levels measured in the edible tissues of the striped red mullet *(Mullus barbatus)* and of the anchovy *(Engraulis encrasicholus)* were such as to guarantee the quality of this fish resource. Generally speaking, the results obtained indicate higher contamination levels in anchovies than in the mullet, with higher values found in Apulia and lower values in Tuscany. However, on the average, both species show low levels of persistent organic contaminants compared to those of other marine species, thus excluding the possibility of representing a human health hazard if consumed in a balanced way.

[1] *Within the framework of the MOMA Project (2004), financed by the Ministry of Agricultural and Forestry Policies and by the Ministry of the Environment and of the Protection of the Territory and Sea, the Operating Unit of the University of Siena was composed of: Prof. Silvano Focardi, Dr. Cristiana Guerranti, Dr. Guido Perra. (http://www.progettomoma.com)*

Effects of an alluvial event on the quality of the fish caught in a highly anthropized area of the Region of Calabria[2]

Dr. MONIA RENZI - *Centro Ricerche Ecologia lagunare, pesca ed acquacoltura (Ecolab), Polo Univ. Grossetano*
Prof. SILVANO FOCARDI - *Department of Environmental Sciences, Università degli Studi of Siena*

In July of 2006, the sea-shore region of Vibo Valentia between S. Irene and Pizzo Calabro *(Calabria)* was struck by a relevant alluvial event that affected the infrastructures present in the industrial harbour with the dispersion at sea of sizable amounts of fine-grain terrigenous debris and persistent organic contaminants.

Preliminary surveys conducted immediately after the event highlighted the presence of significant levels of contamination from dioxin and hydrocarbons in the marine sediments in the region facing the industrial area. Four months later, in November 2006, a second round of surveys was conducted on sediments and organisms with the aim of monitoring the evolution of the system, assess the extent of natural recovery and the medium-term effects produced by the event on the quality of the fish caught locally and on the state of health of the Posidonia oceanica prairie.

With respect to the sediments, the survey results obtained show a considerable reduction of contamination from polycyclic aromatic hydrocarbons, pesticides, dioxins and furans, with levels being lower than the risk thresholds reached four months after the event by all the contaminants tested for. The highest concentrations were found in the samples taken at the greatest bathymetric depths and geographically furthest from the industrial area.

The most affected areas revealed a very hasty recovery thanks to coastal debris transport processes that dispersed the terrigenous material also in areas that were not initially affected by the phenomenon. This proves that major acutely disruptive events such as the one under study can be rapidly offset by marine and coastal systems featuring a good circulation of water *(Renzi et al., 2008)*. By contrast, the values recorded in the edible tissues of fish fauna, although considerably below the risk threshold for human consumption, showed that they were slower to recover than sediments in the areas where the impact was initially high *(Mariottini et al., 2007)*. The surveys conducted on the state of health of the Posidonia oceanica sea-grass four months after the flooding showed a slight disturbance of the prairie at shallower bathymetric levels *(Renzi et al., 2007)*. Said results, especially if correlated to the chemo-physical analyses of the sedimentary debris collected among the sea-grass of the prairie, and especially to antifouling molecules, appear to be due more to the chronic impact exercised by the Port of Vibo Marina rather than to the occurrence of the alluvial event *(Renzi et al., 2009)*.

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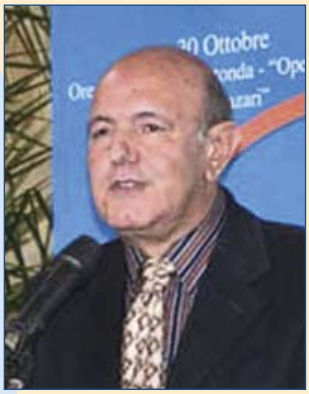
[2] *The activities illustrated, financed by the Commissioner for Environmental Emergencies, were conducted in collaboration with the ARPACAL Scientific Directorate of Catanzaro (E. Cellini e L Minutolo), the Nautilus Cooperative (ViboValenzia), the Department of Environmental Sciences of the University of Siena, under the scientific direction of Prof. Silvano Focardi (I. Corsi, G. Perra, D. Baroni, M. Volterrani, C. Guerranti, M. Mariottini, M. Graziosi, T. Benincasa, A. Moroni, M. Ruta).*

The "Mediterranean Fishing Observatory

Ing. GIUSEPPE PERNICE - *Coordinator of the "Mediterranean Fishing Observatory" - IAMC-CNR researcher*



The **"Mediterranean Fishing Observatory"**, recently acknowledged by a law of the Sicilian Region, *"aims at activating studies concerning innovation, internationalization, market, district and marine environment finance, to support fishing industry, and regional Administration. Moreover, the Observatory annually reports on fishing and aquaculture".*

The Observatory was established by the Industrial Fishing Productive District of Mazara del Vallo in 2006, to support concerned governance and institutional activities. It has become an instrument of advice and orientation for the District, providing technical-scientific, socio-economic, legal and administrative analysis. The Observatory monitors biological, technical, socio-economic, legal and environmental aspects and investigates analysis and knowledge of the Sicilian Mediterranean fishing industry. It proposes initiatives concerning protection of marine resources, internationalization of the District and companies, modernization and reorganization of the sector and qualification of Sicilian Channel fishing products. Such a qualification is obtained through a certification and common initiatives of transnational marketing, and an assessment and orientation of the Productive Fishing District plans and projects, in collaboration with public and concerned private bodies.

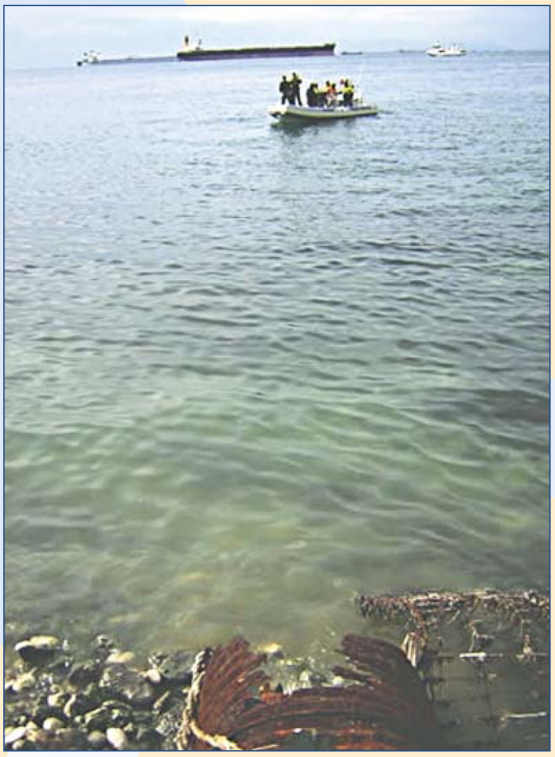
The Observatory is made of 32 members: academics, researchers, regional and government leaders, manufacturers, bankers and maritime fishing experts. An important contribution to this body is offered by the Universities of Palermo *(Faculty of Engineering, Sciences, Economics)*, Catania, Messina and Calabria, the National Council for Research *(CNR)*, the Central Institute for Scientific Maritime Research *(ICRAM)*, the Scientific and Technological Park of Sicily *(PSTS)*, the Experimental Zoo-prophylactic Institute of Sicily *(IZS)*, the Ministry of Agriculture *(MiPAAF)*, the Ministry of Productive Activities, the Sicilian Region and banks operating in Sicily.

In its two years of activity, the Observatory hold many plenary sittings to discuss specific problems, and it implemented a series of initiatives. The last one was the creation of the "Mediterranean Forum" in 2008, with the cooperation of eminent political and scientific personalities from the Arab Republic of Egypt, the Tunisian Republic, the Great Socialist People's Libyan Arab Jamahiriya, the Republic of Malta, the Republic of Algeria and Morocco. Moreover the Forum involves Syria, Lebanon, Jordan and other African coast countries, as well as operators of other agricultural and food industry.

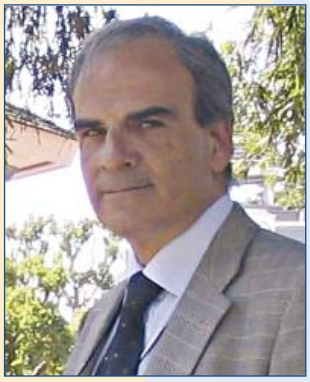
The Observatory has become a link between fishing companies and Universities together with institutes of scientific research and technological innovations. It can also help companies to develop projects and guarantee the sustainability of the sector. Actually, in a so complex framework as the Southern one, in such a delicate sector as the fishing one, the contribution to research and technological innovation is capital for marine environment and fishing resources protection. Sicily is the seat of groups of excellent researchers concerned with fishing. Really, the problem is directing their work towards the strategic priorities of the sector so that small and medium-sized fishing companies can get scientific results and become competitive at a national and international level, while protecting environment.

ECOPORT 8

Prof. LEONARDO DAMIANI - *Director DIAC – Department of Water Engineering and Chemistry Polytechnic of Bari*



The intensification of maritime traffic with economic, social and tourist purposes causes serious problems to the quality of marine environment, especially because of the lack of shared international policies.



As a matter of fact, in consideration of sustainability, EU programmes, concerning maritime highways, corridors and so on, aim at reducing road transport and encouraging maritime transport. Nonetheless, in a future perspective, the growing numbers of ships sailing on the Mediterranean sea raises some concern.

Apart from last years disasters, ordinary maritime traffic control is causing alarming changes in marine environment, *(e.g. the draining of bilge water, etc)*. In order to reduce such problems it is necessary to increase navigation control, and equip harbours, - which are both the main locations interested in maritime traffic and the main potential source of pollution - *allowing them to guarantee environmental services, such as bilge suction systems, etc.*

Moreover, it is necessary to agree on a common procedure, regulating adequate control in harbours, without delaying ship operations. Such an agreement should prevent avoiding control when landing on an harbour, which provides less legal pressure than another, thus putting in danger environmental quality.

Such a confused legislation about eco-management of harbours allows different interpretations at national and local levels, thus increasing *"not physical barriers"*.

ECOPORT is developing and strengthening initiatives for territorial cooperation to obtain a good environmental quality of harbours and transnational corridors. The association intends to assess environmental issues, such as water quality, biodiversity protection, sediment management, training, etc., through a systematic approach. These issues especially concern harbours located along Corridor 8.

Moreover, ECOPORT intends to propose suggestions about a common and shared environmental policy, to encourage a sound and eco-sustainable competitiveness relating to maritime traffic.

ECOPORT8 follows the ambitious strategy of the European Commission for marine environmental protection and integrates in the framework of politic purposes, scheduled between 2007 and 2013, concerning European territorial cooperation, in line with the **6th Environment Action Programme of the EU 2002-2012**, identifying **Community Strategy Guidelines on Cohesion (2006/702/EC), with particular reference to the Axis 2 of the Operational Programme South East Europe 2007-2013**, and setting a transnational scientific network involving port management bodies, too.

The partners of the projects are Research Institutes *(the Politechnic of Bari, the Institute of Marine Biology of Montenegro, the Polytechnic University of Tirana, the Patras Science Park, the National Institute of Marine Geology and Geoecology of Romania, the Bulgarian Academy of Sciences)*, four Adriatic harbours *(Bari, Bar, Durres, Igoumenitsa)* and two located on the Black sea *(Bourgas, Constantza)*. The workgroup strategically involves four European countries *(Italy, Greece, Romania and Bulgaria)* and two IPA countries *(Albania and Montenegro)*, and countries situated along the Corridor 8, connecting the South of Italy with Albania, FYROM, Bulgaria and neighbouring countries. Besides, these areas are also crossed by Corridors connecting Western and Central Europe with the Black sea, such as Corridors 10, 4 and 9.

The High Level Group reports Corridor 8 is considered as part of the transnational SEE axis, connecting trans-European networks with neighbouring and Far East countries, also because of the definition of Corridor 10, providing a direct connection between Austria and Greece.

ECOPORT intends to act in the context determined by Corridor 8, by creating a shared system of eco-management involving harbours. The results of such a project will provide concerned authorities with the opportunity to establish an ENVIRONMENTAL CERTIFICATION, following the example of European best eco practices.

The aim of this project concerns the establishment an environmental certification for the whole network and not only for facilities. Nonetheless, only shared rules and standards, a policy of marine environmental protection shared by port authorities, an updated and integrated monitoring network and a real awareness of authorities will allow to prevent irreversible environmental impacts.

Mediterranean pollution

Dr. MOHAMED NUTTAH - *Fishing Ministry of Libia researcher*

The Mediterranean sea is one of the most heavily polluted, semi-enclosed basins in the world covers 2,500,000 km^2 with an average depth of 1,500 metres the deepest point being over 5,000 metres in the part known as the Ionian sea, between Greece and the *"foot"* of Italy. The coastline extends 46,000km running through 22 countries. The region is known for its particularly mild climate with uniform and moderate temperatures. Rainfall patterns are however, more unpredictable with a high of 1,200 mm per year in Genoa *(Italy)* to a low of 100mm per year in Djerba *(Tunisia)*.

Around its coasts are lands rich in endemic species. The variety of flora is estimated at over 25,000 species, over half of which are endemic. Turkey and Greece alone contain a large proportion of endemic plants, which represent a wealth not only of natural beauty but also of potential medicinal and culinary properties. The major rivers of the region have generated invaluable wetlands such as the deltas of the Nile, the Ebros, or the Rhone. These nutrient-rich wetlands attract an estimated two to five billion migratory birds each year.

Yet, only approximately six per cent of wetlands previously known to have existed in Roman times remain. Today, 82 million people live in coastal cities; by 2025 there will be an estimated 150-170 million. The southern countries account for 32 per cent of the region's population; by 2025 that is expected to have reached 60 per cent.

Seasonal population pressures are also expected. Over 100 million tourists flock to Mediterranean beaches every year and this number is expected to double by 2025. In order to cater for this booming business. The 18 countries bordering the Mediterranean Sea have a population of around 350 million people, of whom 135 million live in the coastal zone; in addition, approximately 100 million tourists visit the Mediterranean region annually. Tourism normally peaks between May and September and is concentrated in the coastal areas.

The United Nations Environment Programme has estimated that 650 million tons of sewage, 129,000 tons of mineral oil, 60,000 tons of mercury, 3,800 tons of lead and 36,000 tons of phosphates are dumped into the Mediterranean each year. Meanwhile, 70 per cent of the wastewater dumped into the Mediterranean is untreated.

The sea is also a major oil transportation route and up to one million tons of crude oil are discharged annually from accidental spills, illegal bunkering and tank cleaning practices, as well as inadequate harbour facilities. Its waters have a very low renewal rate *(80 to 90 years)* making them excessively sensitive to pollution. 80-85% of the total amount of pollutants entering the Mediterranean comes from land-based sources.

Municipal wastes from coastal population centres, including tourist complexes, are discharged directly into the sea, very largely without having been treated. Industrial wastes. It is estimated that approximately 220,000 vessels of more than 100 tonnes cross the Mediterranean each year – about one third of the world's total merchant shipping.

Many ships are carrying hazardous cargo, which if lost would result in severe damage to the marine environment. It is estimated that every year between 100,000 and 150,000 tonnes of crude oil are deliberately released into the sea from shipping activities. Approximately 370 million tonnes of oil are transported annually in the Mediterranean *(more than 20% of the world total)*, with around 250 to 300 oil tankers crossing the Sea every day. Accidental oil spills happen frequently with an average of 10 spills/year. A major oil spill could occur at any time in any part of the Mediterranean.

Athens 23rd October 2006 Millions of tons of pollutants are being discharged into the Mediterranean Sea every year from industrial activities in the countries bordering the Mediterranean region. This was revealed by the Secretariat of the Mediterranean Action Plan *(UNEP/MAP)*, which has been monitoring the discharge of pollutants into the Mediterranean Sea for the last three decades, during a Press Conference held to launch an exhibition to commemorate the 30th Anniversary of the Barcelona Convention.

The major sources of pollution are metal industries, oil refineries and industry, tanneries, organic and inorganic chemical industry and food processing industry. This brief account of contaminated material in the Mediterranean basin and it is necessary to unite the efforts of countries around the Mediterranean and cooperation for the elimination or reduction of pollution as possible, and exchange of experience , technical and study.

Encouraging signals from our seas: the return of monk seals

Dr. SEBASTIANO VENNERI - *Vice President of Legambiente*

The appearance of a monk seal in our seas a few weeks ago is a promising signal for the state of health of the Italian coasts.

It is an exceptional event which perhaps has not received sufficient emphasis from local Administrations and the National Government.

Yet, at least thirty years have elapsed since one was last spotted and even longer since the last indication of resident specimens in the bays along Italian coasts. The monk seal is the symbolic animal of the Mediterranean Sea: once upon a time, it used to inhabit its shores from Spain to Turkey and now there are only a couple of hundred specimens left that are covetously protected in the Greek Archipelago of the Sporad Islands, where they have been converted into a basic economic resource. Better than any other, this aquatic animal compounds the stress factors affecting the Mediterranean: the pollution that has undermined its habitat, the unbridled fishing activities that have deprived it of its nourishment, and then mass tourism that has taken over its hidden-most havens, the sunniest bays where pairs of monk seals used to love lying on the shore, and the pleasure boats and maritime traffic that chased them away with the noise of their combustion engines.

The monk seal in the sea of Giglio Ile

A few decades later, a specimen of this aquatic animal was finally photographed at large of the Island of Giglio, the Municipality that was assigned Legambiente's topmost recognition with the award of Five Sails only a week earlier and that had actually won first place in the special ranking elaborated in collaboration with the Italian Touring Club. For us, this represented the best possible recognition for our work but I think it was an even more important event for the entire community of the inhabitants of the Archipelago, a place that bore witness to a fiery debate on the advisability to establish a protected area there only a decade ago. Today hardly anybody remembers those times and the professionals of the tourist sector can do nothing else but bless the decision that saved the Archipelago from suffering a crisis that unfortunately now pervades most of the Country.

Only those who put their stakes on the quality and protection of the territory have avoided succumbing to these years of recession and economic decline and have instead continued to produce wealth and to convert their natural resources into a potential development factor for these marginal locations that would otherwise have been doomed to isolation. In these past few years, marine parks and protected areas have represented the environmental quality brand of territories that are of great value for our peninsula, that have freed geographically marginal regions from anonymity, have shed light on products of excellence and high-quality crafts, have filled up tourist accommodation facilities during the low season, have created a closely interwoven and sound economic fabric which is now capable of assuring the future of resident populations.

The monk seal spotted a few weeks ago is a sort of living endorsement of the work performed during the past ten years. It is the evidence that protecting the territory is a far-seeing strategic choice that can also be pursued by combining economic reasons, that are far from being negligible in the Tuscan Archipelago, with environmental protection objectives. The monk seal, perhaps the strongest symbol of Mediterranean wildlife protection policies, can apparently co-exist with the significantly high numbers of bathers, pleasure boats, scuba divers and professional fishing activities when these are harmonised under the knowing management of a Park Authority.

It represents a good stimulus in view of the forthcoming Conference on Protected Areas, a sign of hope for those who, like us, continue to be resolutely convinced that environmental protection and high-quality tourism are Italy's greatest opportunity to come to terms with the crisis and overcome the challenges set forth by a globalised world.

Valorizing and Protecting the Underwater Archaeological Heritage

Prof. LUCIO UBERTINI - *University La Sapienza of Rome*

Throughout the millennia, the Mediterranean Sea has represented a crossroads of civilizations and commercial trade whose traces along all our coasts and on the bottom of the sea are the significant evidence thereof. The seas are the repositories of a relevant underwater archaeological heritage, the knowledge and the precise location of which are the primary basic elements required to assure their protection and valorization.
Exploring the sea bed has always exercised a great fascination over Man and, to this effect, we can recall the innumerable fantastic feats attributed to Alexander the Great who was reported to have been lowered into the sea enclosed in a glass protection in order to get a close-up view of the marvels of this submerged world.

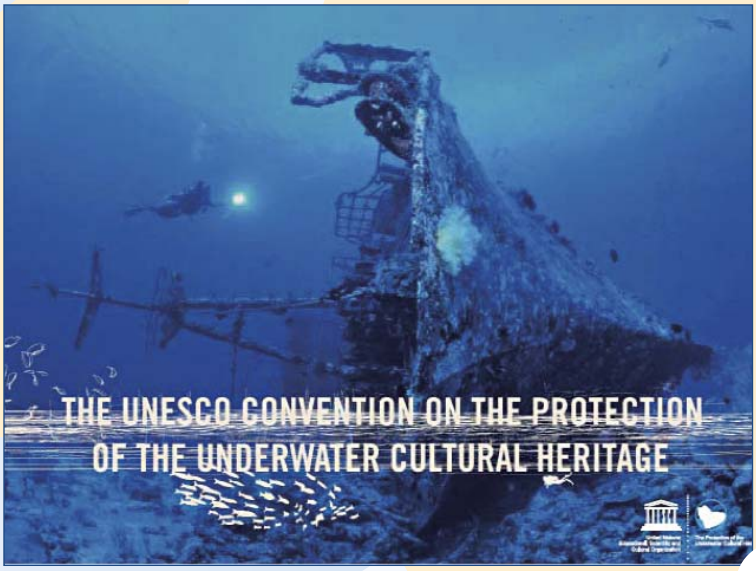
Systematic research efforts in Italian seas began in 1957 with the creation, within the Istituto Internazionale di Studi Liguri, of the Centro Sperimentale di Archeologia Sottomarina, headquartered in Albenga, where Mediterranean underwater research was first expedited following the finding and the exploration by Nino Lamboglia, a pioneer in underwater archaeological exploration, of the Roman shipwreck precisely referred to as *"of Albenga"*.

In 1958, Italy was the first country to obtain a military ship to use for the purpose of underwater archaeological research that, appropriately equipped, made it possible to perform exploration campaigns along all the Italian shoreline, exploring shipwrecks and submerged cities.

Unique in its kind is the fortuitous finding at Fiumicino, during an excavation in the construction work of the airport, of the hulls of five ships that can be dated abreast of the II and III Century of the Christian era and that help to shed significant light on the construction techniques of the shipwrights of ancient times.

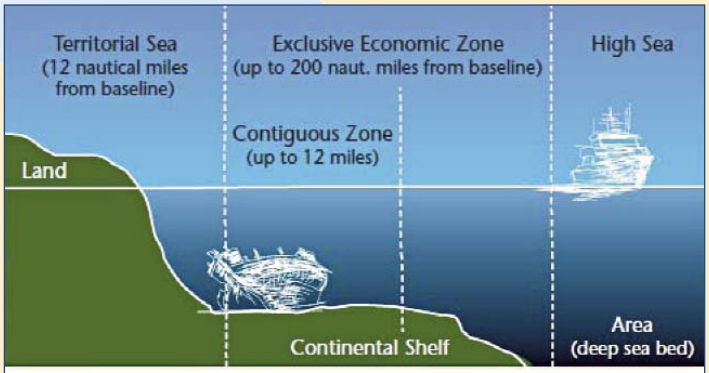
The interest for the heritage concealed underwater is sanctioned by the UNESCO Convention on the Protection of the Underwater Cultural Heritage, that came into effect on the 2nd of January 2009.

The Convention sets forth a specific international cooperation



From First session of the meeting of States parties to the convention On the protection of the Underwater cultural heritage 26/27 March 2009, Paris, UNESCO

system for the performance of actions aimed at protecting underwater cultural heritage. The Coastal Zone involved lies within the Exclusive Economic Zone *(shown in the figure below)* and as the in situ conservation of the heritage is one of the founding principles of the Convention, all the information shared by the States that are parties to UNESCO is strictly confidential and is restricted to the competent Authorities.



Suddivisione della coastal zone

To date research activities, at least in the Mediterranean, have been thorough although what should be undoubtedly enhanced is the safeguard of the findings as well as their control and monitoring, in order to improve the protection of underwater archaeological sites.

Multidisciplinary activities are needed in order to increase the collection of both published and unpublished information, perform instrumental measurements and verifications as well as the classification and evaluation of data and the definition of the hydrodynamics and correlated stress factors.

An effort is needed among the different disciplines to try to find a common language on the basis of which to achieve the targeted results of excellence. A very good example of this is the "Submarine archaeology and coastal management: Steps Towards an Integrated Solution in Alexandria, Egypt" Project promoted by the UNESCO global platform *"Environment and development in coastal regions and in small islands" (CSI)*, which focuses on researching into several scientific aspects:

- The largest emporium of the inhabited world (Greco-Roman era)
- Marine underwater research studies of the ancient Pharos
- Legal principles underlying the protection of underwater cultural heritage
- Human impact on the marine environment of Alexandria
- Wave propagation and sedimentation in the Pharos site.

Italy can claim a leading role in the history of underwater archaeology as the curator of an extremely valuable archaeological heritage of priceless documentary relevance; suffice it to think that the archaeological heritage census carried out in the Regions of Basilicata, Campania, Apulia and Calabria alone singled out up to 287 archaeological sites.

Precisely in Italy, after World War II, the first steps were taken to outline a rigorously scientific investigation methodology and a rational organization of the underwater activities to be performed with appropriate means under an effective coordination system.

In addition to recovering unique items, the work of researchers is aimed at defining specific methods based on scientific studies with which to define the morphology of the sites, their stability, the conservation-related risk factors and their interaction with the marine environment, as well as the reconstruction of important portions of our history, ranging from military and trade traffic to the art and culture of ancient civilizations.

Genetic data integration for biologic resource management in the framework of Mediterranean cooperation

Dr. FERRUCCIO MALTAGLIATI - *Pisa University, Biology Department, Marine Biology and Environment*

Molecular genetic data have been largely used in order to tackle various issues concerning marine species, such as, by way of an example, the detection of conservation stocks and units or the assessment of the population genetic erosion resulting from excessive fishing activities. Today, these data can be obtained rather easily and in a short time, owing to the recent development and the rapid spreading of biomolecular techniques that an increasingly large number of laboratories can use.

As a matter of fact, up to date, the genetic data obtained by means of biomolecular techniques are already available for most of the commercially exploited species. Nonetheless, some criticalities are to be highlighted with respect to the way in which these data are used. I would like to draw attention to the genetic data integration not only in the models used by the biologists interested in fishing techniques, but also in the management policies regarding the species that can be caught. Even though, today, there is a general willingness to integrate such data in the fishery management plans, progress appears to be rather slow. Behind such situation, there exist many complex factors: some of them are just of a biological nature, others are connected to the intrinsically low resolutive power of genetic data in some species. The ongoing technological development will probably close such gap in a relatively short time. Moreover, the flow of information is not sufficient and this situation represents a further problem to be solved. Not only biologists and managers, but also molecular ecologists and biologists working in the fishing sector do not exchange data and information. Biomolecular data might, on the contrary, provide useful elements to solve short-term questions and help fishery managers in their activities. In fact, a large quantity of genetic data are used in the interpretation of medium and long-term bio-ecological processes *(evolutionary scale)*, but they are seldom taken in account in the definition of fishery management policies; such processes would represent the only viable basis for long-term management.

During the **XIX Conference on the Sea**, held in Tunis, from November 28th to December 1st 2008 - for exhaustive information on this event, see the recent article by Beatrice Bardelli entitled **"The XIX Rassegna del Mare of Mareamico in Tunis"**, published in the review Economia & Ambiente, 1-2: 29-35, 2009 – interesting future developments were highlighted; worth mentioning is the ongoing cooperation development in the fishing sector that involves the European and African Mediterranean countries. Such cooperation is aimed, on the one hand, at fostering the economy of the Mediterranean countries and, on the other, at allowing a greater exploitation of the North-African stocks of many target species. For appropriate fishing management policies in such areas, it will be necessary to acquire sufficient biological and environmental knowledge on the North-African stocks which are less known from a scientific standpoint and less concerned by the fishing activities. Therefore, biology research programmes should be carried out jointly by both European and North-African scientific teams. Such programmes would provide the researchers from the Northern and Southern borders with new data about the less known Mediterranean stocks. The collaboration relations would thus represent a valuable prerogative for scientific training and scientific development in general.

Pollution by noxious substances in fish

Dott. MOATAZ ALNATAH - *Fishing Ministry of Libia researcher*

Fish has long been considered one of the most important sources of water resources, and it is also a good source of high value proteins destined to be compared with red meat, poultry, pulses, bread, eggs and milk *(which has the highest nutritional value in relation to proteins)*. It has high values of Vitamins A and D, and it is also food for other animals, therefore it is important to make it part of our daily food consumption, especially for children, to strengthen the bones.

Because of the worldwide and local environmental pollution, unfortunately, the contamination of fish has increased and in a sense it has become harmful for health. Indeed, the concentration of noxious substances in fishing waters gives an exact indication of the level of environmental pollution and the exact measure of the fish contamination level. On top of the list of the causes for this major ecological disaster stands the pollution by heavy metals. The pollution of rivers and seas due to bad waste handling solutions is particularly felt in Japan where fish is a daily food, eaten at every meal - breakfast included. However, in general it is largely found in the rest of Europe, where the huge industrial development threatens the right development of water resources. The three most noxious heavy metals which pollute water and fish are mercury, cadmium and lead.

MERCURY: undoubtedly it is the most toxic of all heavy metals. Its harmfulness strikes the brain, the spinal marrow and nerve centers and causes the so-called Minamata disease, caused by the pollution of the Minamata River, Japan, mainly due to industrial plastic waste.

"The fisherman" - Leptis Magna (Libia)

Symptoms: mercury poisoning is the cause of the following troubles to the body and the brain: ● Neurosis. ● Loss of memory. ● Loss of confidence in oneself.

Another very dangerous side effect of this disease is that mercury does penetrate the tissue structure protecting the fetus inside the mother's womb and makes irreparable damage to its brain. Research studies have shown that beyond the pollution by mercury in the waters of a northern shore region, metal mercury is used by electrolysis plants producing salt, chlorine and caustic soda. The World Health Organization sets the tolerable amount of mercury in fish at 500 ppb. The percentage of mercury found in Nippon fish goes from 500 to 20000 ppb; mackerel and tuna are the most infected species.

CADMIUM: cadmium poisoning-related diseases arise after several years and after the deposit of big quantities of it in the body. The result of this contamination is found in the so-called Itai-Itai disease, found for the first time in Japan after the contamination by the plants and mines of the surrounding area of some of the rice cultivations irrigated with heavily poisoned river water and with a concentration of

cadmium equal to 5 parts per billion to 180 ppb.

Symptoms: ● Impaired kidney function leading to kidney failure. ● Bone weakening due to unbalanced amount of calcium in the body.

The World Health Organization sets the tolerable daily amount of cadmium at 450 micro grams per person and this threshold cannot be exceed in fish and fish products of 100 ppb.

LEAD: the main sources of lead environmental pollution are due to vehicle exhaust and industrial emissions. Therefore meat and fruits and vegetables - especially those without peel like strawberries and apricots – are more vulnerable to contamination. Fish contamination by lead is the result of the dumping of industrial waste into rivers.

Symptoms: ● Anemia. ● Loss of appetite. ● Discoloration of gums, when lead levels in blood amount to 0.6 – 0.8 ppm. ● In serious situations it may lead to kidney failure.

The World Health Organization sets the tolerable amount of lead in uncanned fish at 2000 ppm. As to canned fish, the highest tolerable amount is equal to 1000 ppm, since cans normally release small amounts of lead that are then spread over food.

PESTICIDES: There are almost 500 different kinds of pesticides used in agriculture, but the most widespread is DDT, despite the fact that many countries all around the world deny that it is highly pollutant and harmful for the environment and the animal and human worlds since the chemicals found in DDT are assimilated by the human body, especially by fat tissue. This insecticide, ending up in exchange waters, is concentrated in algae and micro-organisms on which fish feed and therefore contaminate them too. The higher is the fat percentage of the fish and the higher are the contamination and poisoning levels in relation to the surrounding water environment.

Main symptoms arising when consumers eat DDT-contaminated fish: ● Irritation of the nervous system. ● Serious liver impairment. ● Anemia. ● Hormonal troubles. ● Change in the amount of sodium and potassium in the body.

Very high levels of chlorine-based pesticides were found in the vitamins contained in the extract of fish liver, used to in children's growth. The simple administration of a spoon of it may cause a real poisoning in children.

However, despite this, some fresh and frozen fish retailers do not stop to sprinkle it with pesticides to keep it in good conditions for the longest period of time. That shows the absence of consumers' awareness – because they do not know that this practice is harmful to their health – and of retailers' awareness that do not have the courage to call the attention of everybody on this practice.

Conditions to meet to avoid the pesticide contamination of fish:

- The amounts and date of pesticide spraying must be indicated on food.
- To encourage the activities carried out by the Ministry of Health to educate retailers and increase control activities.
- Educating consumers to mistrust pesticide spraying without affecting the fish demand on the market.
- To avoid the access of drain water to water resources of rivers and lakes and to the places where fish live.

Foundation of a sanctuary of biodiversity in the Sicilian Channel and its economic and environmental opportunities

Dr. FRANCO ANDALORO - *ISPRA* **Dr. SERGIO MARINO** - *Director of Arpa Sicilia*

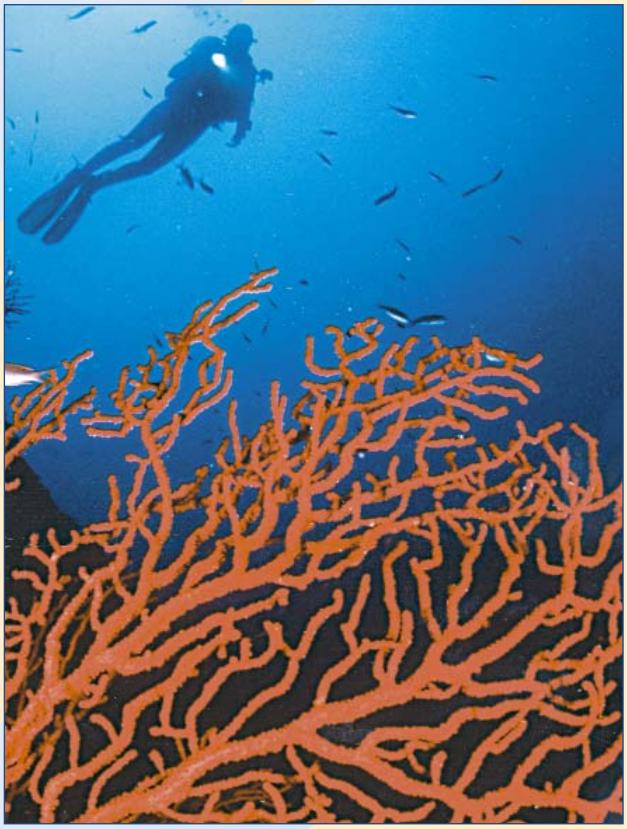
Today the Sicilian Channel is the main hotspot of Mediterranean biodiversity. In this area, marked by Sicily, Malta and Tunisia, you can find almost all protected Mediterranean marine species both pelagic and nektonic, such as sperm whales, common whales, bottlenose dolphins, striped dolphins, common dolphins, pilot whales, turtles, leatherback turtles, basking sharks, white sharks and, more rarely, seals and mantas.

Franco Andaloro

Moreover, the Sicilian Channel is characterized by several banks, called Graham, Skerchi, Avventura, Talbot, Terribile, Alluffo, etc., which are sensitive areas characterized by fragile ecosystems, but, at the same time, crucial for their biodiversity. These areas are rich in benthonic, animal and plant species threatened by illegal fishing and poaching.

The Sicilian Channel is the most important fishing zone, as it is possible to fish major and minor big pelagic species, such as bluefin tuna, little tuna, dolphinfish and amberjack.

You can also find small pelagic species, such as anchovy, mackerel, goldstripe sardinella and pilchard, allowing, since ancient times, human settlement on the coast and the development of cannery industry, whose origins lay in the ancient “garum”.



The Sicilian Channel is the mostly exposed Mediterranean area to direct and indirect effects of climatic changes, especially sea warming and changes in basin water circulation. For these reasons, foreign species, from the Atlantic Ocean and the Red sea, reach the Mediterranean area, and rapidly change its biodiversity, especially when ecosystems are suffering and domestic species are weak. Actually, the Italian sea is the most invaded by foreign species.

A further problem is an intense maritime traffic, as tankers are not concerned by rules providing for double-hulls, thus exposing the maritime area to the risk of draining of bilge water, oil and water used to wash holds and tankers.

Sergio Marino

Finally, the Sicilian Channel waters guard a wide archaeological treasure, which has to be protected from vandalism and theft. Thieves of archaeological finds are more and more numerous and equipped of technological devices useful to find and collect treasures.

The only possibility to protect biodiversity and environmental and cultural resources in the Sicilian Channel is the foundation of a transnational protected area, a sanctuary of Mediterranean marine biodiversity. Such a sanctuary should concretely save protected species and sensitive ecosystems from harm and prevent illegal fishing, by regulating protecting instruments and recommending measures about mitigation and adaptation to climatic change, fighting against foreign species and Illegal Unreported Unregulated Fishing *(IUUF*) and, finally, about sustainable fishing in domestic and international waters.

The foundation of the sanctuary of biodiversity would be not only an instrument for protection of transnational fish population, but also an important opportunity for fishing and tourist economy and a remarkable experience of Euro-Mediterranean cooperation.

The role played by young people and women in modern Tunisia...

Dr. CHAOUCH AOUIJ SALOUA - *University of Tunis "El Manar", Faculty of Science of Tunis*

I am so glad to be here, in such a friendly atmosphere, on the occasion of this meeting organized by Mareamico, and I am proud of being a member of its Scientific Committee.

On this occasion I would like to offer my contribution to the Mediterranean debate presenting the Tunisian position about the main themes of this international meeting, paying special attention to the role of young people and maritime jobs in an environmental protection an sustainable development.

From a Tunisian point of view, the role played by women and by young people in particular is an essential opportunity for success. Actually, women guarantee continuity by filling generation gaps, besides offering their personal contribution. Their role is far more important when they graduate. In Tunisia, country women are an asset for sustainable development and they stabilise the whole society, because of their leading role within the family unit, which is the cornerstone of society itself, their contribution to the enhancement of local and regional resources in collaboration with public and private bodies.

Moreover, the private and public sectors of society have come closer to women. Actually, women's rights evolved beyond the phase of political activism, and women assert themselves for their skills. The political will provides for female participation of at least 30% in all sectors, political ones included, fair salaries, school leaving age raised to 16, children's rights, enforced since January 11th,1996, training and retraining courses, at any age, for all social categories, handicapped included.

Facilities have a place of honour too, in Tunisia: from schools and sport facilities, to university decentralization, modern facilities for communication technology, highway extension and link roads trough the whole country and international projects such as the Enfidha gigantic airport.

This confirms the progressive nature of modern Tunisia, preparing a future of authorized integration and global spread in all life areas within an environment balancing political, economic, social and cultural aspects. Some of these aspects are education, especially university and professional training conformed to Euro-Mediterranean standards, information and employment, especially for what concerns maritime jobs and the opportunity represented by 1300 Km of coast.

Thus, my country, at the crossroads of continents and civilisation, praises knowledge exchange with friends, with North Coast countries, within an organized institutional framework, stating rights and duties, avoiding illegality and fundamentalism.

Maritime jobs consist in the gathering of seashells by country women, fishing and sea, wadis and weirs farming, fish processing and export, maritime transport and the organisation of port activities, tourism, security, quality… Well, let's consider all aspects and try to make successful plans.

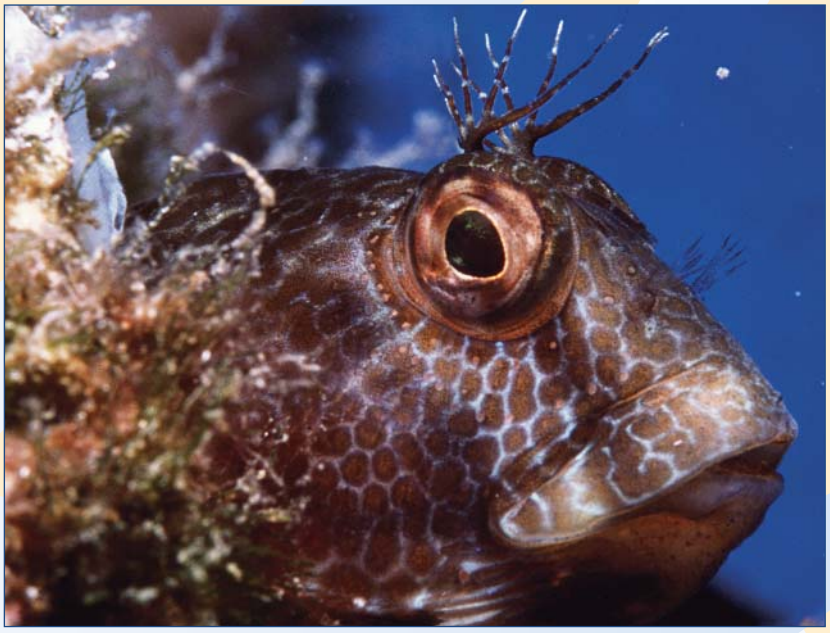
The desertification process of Mediterranean rocky seabeds

Dr. PAOLA GIANGUZZA - *Department of Ecology – University of Palermo*

Factors such as climate change, availability of nutrients and/or toxic substances, the reduction of water tables, the fragmentation of the habitat, the indiscriminate catch of species and consequent loss of biodiversity influence the functioning of ecosystems and do not show a constant temporal trend.

In some ecosystems, the above mentioned changes causes immediate reactions, whereas in others no reaction is observed until a limit is exceeded above which the system reacts in a quick and unpredictable way. This means that, in some environmental conditions, the ecosystem may have two or more alternate stable states, separated by an unstable equilibrium setting the boundaries between "the attraction basins of the states *(Lewontin's theory of alternate stable states - 1968)*. This theory also argues that natural systems are often in a persistent and resilient alternate state: alternate combinations of ecosystem states and environmental conditions that can persist at a specific spatial and temporal scale. According to Lewontin's theory, the time and size of a perturbation *(natural or anthropic)* can push the community towards the attraction basin of an alternate state, a new stable state that, once reached, through a divergent succession can indefinitely persist for several generations.

Therefore positive feedback due to interactions among biotic and abiotic factors such as pasturage and predation activities, fire frequency, pollution, local extinctions, invasions, the nutrient load ect can prevent the community from returning to the previous state.



Many studies show that the human species can deeply modify the state of marine ecosystems, thus indirectly influencing prey-predator relationships.

These indirect interactions, called trophic cascades, can be imagined as a chain reaction generated by the removal of an apical predator determining cascade changes at all lower trophic levels. Particularly interesting are the negative repercussions that the removal of an api-

cal predator can have on algal communities. The disappearance of Enhydra lutris *(sea otter)*, has caused a sudden expansion of Strongylocentrus franciscanus *(sea-urchin)* in Californian coast and the subsequent erosion of the kelp forest Macrocystis pyrifera. If combined to other factors, the intensity variation of the grazing of herbivorous species, modulated by the loss of a keystone species *(sensu Paine 1969),* can cause a change of state both in land and marine systems.

For instance, in temperate marine systems, a growth of sea-urchin pasture can cause such changes as to foster the succession from a complex state to a simpler state *(coralline algae)* called barren state. These states are considered stable and alternate *(AS)* since they are highly resilient: the "unwelcome" state can persist despite the disturbing source, the high population density of sea-urchins, diminishes.

The development of barrens is a globally known phenomenon. These submarine deserts are present along temperate, subtropical and tropical coasts, but the factors responsible for their development and preservation are still being studied.

Anyway, many studies support the hypothesis that along temperate coasts the lack of sea-urchin predators *(fish such as the Diplodus)* can trigger the barren development process. Urchins are habitat determiners, since, if present in large numbers, by means of their pasture they can generate and preserve the barren state. In Mediterranean rocky coasts, a high population density of Paracentrotus lividus *(Lam.)* and Arbacia lixula *(L.)* can cause the transition from macrofilamentous algae to coralline algae. The final outcome is the creation of vast desert areas almost exclusively colonised by coralline algae, therefore areas with a low biodiversity and vegetal productivity.

This condition can also have negative consequences on the coastal fauna using macroalgae as a shelter, food and useful settlement substrate.

Arbacia lixula

Food resources for modern aquaculture

Prof. MARCO SAROGLIA e Dr.ssa GENCIANA TEROVA - *Dipartimento di Biotecnologia e Scienze Molecolari, Insubria University - Varese*

Arguably, aquaculture is the fastest growing food industry. Currently, it accounts for at least 50% of the total fish production worldwide and appears capable of satisfying the demand increase foreseen for the next decades, providing an adequate supply to the increasing human population. In 2003, the yearly increase in worldwide production equaled about 6,6% if we consider aquatic animals only, or 8% if we add up all aquatic products.

A comparison of the main food staples' production rates shows aquaculture solidly in the lead, closely followed by poultry breeding *(Fig. 1)*.

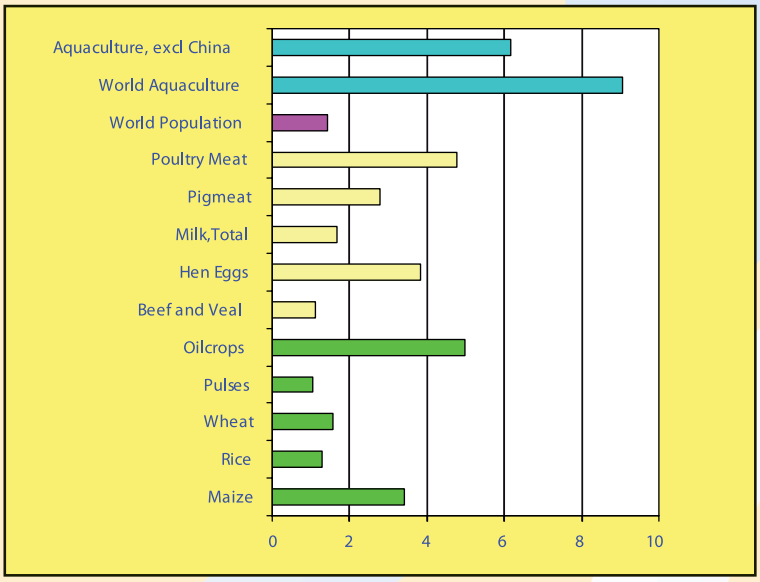


Fig. 1 - Aquaculture and poultry are the two food industries with the greatest yearly growth percentages (Kaushik, 2009)

PBy the end of the first decade of the 21st century, worldwide aquaculture will exceed 60 million tons, vs. about 130 million tons of global fish production, fishing included. In order to maintain the current average pro capite consumption of fish, equal to 16.7 kg, facing a population estimate of about 9 billion by 2030, we will require an additional 40 million tons of product, which the fishing industry cannot provide in view of the severe depletion of its resources. Only aquaculture can assure such a growth. That result can be achieved by developing all possible types of aquaculture, including its intensive modes, although they depend on fishing for the proteins and lipids required to feed the stock.

No doubt, the availability of fish meal and oil is the bottle neck of aquaculture development. In fact, fish meal production has not increased in the last 20 years, and the growth of intensive fish breeding has caused a greater transfer of fishing by-products to feed production geared to that zootechnic segment. Meanwhile, experiments were conducted to partially surrogate fish meals *(FM)* and oils *(FO)* with vegetal meals *(VM)* and oils *(VO)*. Tomorrow's challenge then is to increase the conversion efficiency and partially replace FM with FO and VM with VO, respectively.

During the past 20 years, feed blend improvements and better fishery management have allowed a pro-

gressive increase in feed conversion efficiency, reducing the value of the conversion factor *(FCR)*, as shown in Table 1.

Componente	1980	1990	2000
Proteina grezza (%)	45	42	36
Lipidi grezzi (%)	18	32	38
Ceneri (%)	9	7	6
Fibra grezza (%)	2	1	1
NFE (%)	18	12	13
Umido (%)	8	6	6
DE (MJ/kg)	17	21	22
FCR, stima biologica	1,32	1,14	1,10

Table 1 - Conversion efficiency increase in salmon breeding, from 1980 to 2000 (Allodi, 2008)

UUp to 75% of fish meal can be replaced with vegetal meals without negatively impacting growth nor FCR value *(Gomez-Requeni et al., 2005)*. Thus, while retaining 45% of raw proteins, farm-raised salmon generates about 79% of fish proteins used in blending its feed. Consequently, if the amount of fish meal used in feedstuffs gets stabilized at about 25% of protein requirement, we will be able to produce more fish proteins than the amount used for blending feed. It is reasonable to expect that in 3-5 years hence, researchers will gain the knowledge required to achieve such a result.

In order to achieve a sustainable aquaculture, the fish feed industry should reduce the use of FM and FO, focusing on alternative raw materials. The FM/FO ratio in fish feed should be reduced by 5-10% each year and this goal will be reached even sooner as long as the price of fish meal and oil resources obtained by fishing remains high. The greatest challenge is to achieve the highest substitution percentages. In the European Union alone, land animal processing by-products amount to an estimated 16 million tons/year. Fats and proteins derived from land animals have high nutritional value for the fish in fisheries. Furthermore, poultry processing by-products represent a protein resource quantitatively greater then the total quantity of fish meal actually used in feedstuffs, and are well tolerated by the stock. While European laws allow a limited use of blood by-products, animal fats and protein silage, public opinion, and therefore the market acceptability, are the main obstacle.

This said, it is evident that – in order to secure its immediate future – aquaculturists need to better know all available nutritional strategies, and that said knowledge can be derived only by further studying nutrition, digestion and absorption physiology, as well as appetite control, using the most modern and powerful analytical tools at our disposal.

Replacement of fish meals and oils with vegetal meals and oils

On a global scale, fishing products used by the world feed industry amount to about 30 million tons, six of which are constituted by fish meal and one by fish oil. Thus, considering the 6:1 FM/FO ratio, fish oil emerges as the limiting factor.

During the last two decades, several researches have been conducted, mainly on salmonides, to evaluate the use of protein sources alternative to fish meal, paying particular attention to protein plants. Only recently these studies have encompassed marine species economically relevant for the Mediterranean aquaculture, such as the sea bass and sea bream. The results show that a partial replacement of marine proteins with some vegetal counterparts does not affect fish growth or conversion *(Francis et al., 2006)*. At the

same time, EU research projects *(RAFOA-Q5RS-2000-30058, Quinto EU-FP)* have studied the partial replacement of fish oil with vegetal oils in feeds for several species. Their results show that a high percentage substitution of FO with VO is possible in feedstuffs for such fish stock as Atlantic salmon, rainbow trout, sea bream and sea bass, without significant effects in terms of growth and conversion *(Tibaldi et al., 2006)*. Nevertheless, the fish might present some problems. For instance, the replacement of FO with VO increases the impact of cataracts on Atlantic salmon. Furthermore, some blood parameters suggest that fish fed a VO-based diet might be more sensitive to stress.

Many studies on this matter indicate that, even without apparent effects on growth performance, a significant substitution of fish proteins and oils causes a number of metabolic alterations in strictly carnivore fish, which could debase the nutritional quality of fish destined to human consumption. These effects are still little known, but the evidence leads to conclude that the protein quality of the fish diet influences meat texture, adiposity and fat distribution in different fish organs and tissues. Additionally, a high percentage of fish oil replacement reduces n-3 HUFA *(Highly Unsaturated Fatty Acids)* levels, and increases the n-6 PUFA *(Poly Unsaturated Fatty Acids)* content in fillets. This aspect has been researched less in Mediterranean species. Although a significant replacement of fish oils and proteins with vegetal surrogates does not compromise fish growth, at least in terms of experimental appearance, it could cause health problems to human consumers, who would loose the expected contribution of precious fatty acids, the very focus of a fish-based diet *(Tocher et al., 2000)*.

Therefore, it seems indispensable to increase our knowledge of the mechanisms that control metabolic energy and fish lipid homeostasis. Optimal dietary levels of docosaesaenoic *(DHA, 22:6n-3)*, eicosapentaenoic *(EPA, 20:5n-3)* and arachidonic *(ARA, 20:4n-6)* acids have been studied in fish main species, It is known that marine species require significant contributions of HUFA in their diet, while their fresh water counterparts can synthesize, at least partially, EPA and DHA from linolenic acid *(LNA, 18:3n-3)* and ARA from linoleic acid *(LA)* 18:2n-6 *(Seiliez et al., 2003; Tocher et al., 2002)*, thanks to the presence of enzymes such as desaturase and elongase. Yet, in marine species, LNA transformation into EPA and DHA is very slow, forcing the dietary inclusion of the full HUFA requirement.

Although known for quite some time, the basic mechanism of such transformation in not sufficiently understood, and the molecular mechanisms involved in fish HUFA biosynthesis are simply unknown. Thus, our capability to sense which VO compositions are most effective as a fish oil surrogate is limited. Among the genes involved in marine fish lipid metabolism, we sufficiently know that the enzymes fatty acyl Δ6 desaturase and PUFA elongase are responsible for two important steps of the HUFA biosynthesis process, such as desaturation and carbon chain lengthening, and can single out peroxisome proliferator-activated receptors *(PPARs)*, Acyl-CoA oxidase, Apolipoprotein E and Malic enzyme as key elements. As it been shown, these gene transcripts *(mRNA)* are impacted by both fish nutritional conditions and type of administered diet *(Diez et al., 2007; Seiliez et al., 2003)*.

Recent studies have dealt with the opportunities offered by the so-called *"functional foods"*, which could mitigate the negative effects of a high lipid content diet, as well as those of vegetal surrogates lacking HUFA *(Kennedy et al., 2007)*. In this context, conjugated linoleic acid *(CLA)* seems to offer some benefits in terms of both fish and human lipid metabolism. In fact, CLA seems to affect the expression of several genes of critical importance to lipid homeostasis, including the codifying activity of the reductase gene. Unfortunately, there is alack of molecular studies on both commercial-size fish and marine species, knowing well that their lipid metabolism differs from freshwater fish, especially in terms of HUFA.

A limited availability of fishing resources makes it unsustainable to use only fish oil in feeding farm-raised fish. A contextual replacement of fish oil and meal with vegetal sources must constitute the absolute priority while researching feedstuffs for a sustainable aquaculture.

FUNCTIONAL GENOMICS IN MODERN DIETARY STUDIES IN AQUACULTURE

Having recognized that nutrients: *1)* modify gene expression, *2)* can modify normal metabolism, and *3)* affect health conditions *(Corthésy-Theulaz et al., 2005)*, the scientific community is increasingly involved in tackling the relationships between diet, health conditions, wel- fare, and pathological processes, applying molecular study techniques *(Kaput and Rodriguez, 2004; Davis and Hord, 2005)*. Fields such as functional genomics and nutrigenomics deal with the study of diet ingredients on fish metabolism *(Müller and Kersten, 2003*; *Mutch et al., 2005)*.

In nutritional studies, one can use the gene expression profile with three separate goals in mind (Müller and Kersten, 2003), in order to: ● Identify and characterize the basic molecular process that can be positively or negatively affected by nutrients. ● Interfere with the specific mechanisms that trigger said positive or negative effects. ● Specify the genes that can be influenced by nutrients, and used as candidate descriptor or biomarker.

It is not a case that the most current research themes on fish nutrition have adopted functional genomics as a valid analytical tool. For instance, even a partial substitution of FM with hydrolyzed proteins, requiring the addition of some essential amino acids (EAA) in form of di– and tri–peptides, raises complex issues, mainly involving the economics of feed preparation processes, for example the affinity of said processes to intestinal carriers such as PepT-1 (Terova et al., 2009).

These types of studies can provide us with early information on fish responses at the cellular level, and during the last eight years, functional genomics and nutrigenomics studies have become ever more frequent. A growing number of Expressed Sequence Tags (ESTs) related to farm-raised species has been sequenced and made available on international genetic banks. Some studies on sea bass conducted by our Department have been focused on the effects of fasting followed by re-feeding and are related by Terova et al. (2006; 2007a; 2007b; 2008; 2009). Theses researches concern without limitations, digestive enzymes (progastricsine), orexigenic hormones (ghrelin), glucose carrier, insulin-like growth factors (IGFs), miostatin, and intestinal carriers. Other studies in literature analyze the effects of replacing fish proteins with vegetal proteins in the Atlantic salmon somatotrope system. Among them, are the studies by Hevrøy et al. (2008), conducted on mRNA levels of target genes, such as GH, GH-R, IGF-I, IGF-II, IGFBP-1, IGF-IR and CCK-L in the brain, liver, muscle and plasma. The Authors have related that reduced rationing, as well as a vegetal protein-based diet, causes a growth reduction or other relevant alterations vs. the fish meal-fed controls. Gómez-Requeni et al. (2005) studied the somatotropic axis activity in young rainbow trouts (Oncorhynchus mykiss) fed with fish or vegetal meals, noting a clear connection with the IGF-I gene activity.

By now, molecular methodologies have been simplified and their costs are fully comparable, if not inferior to those of chromatographic analysis, thus becoming an indispensable tool of planned quality production in aquaculture. Still, with the exception of a few species, genetic databases lack information on the majority of the farm-bred species. Nevertheless, it is evident that a molecular approach allows gathering early information on fish living standards, in terms of its well-being and nutrition. Further studies are required to compare genetic activity and its respective circulating proteins, different breeding and feeding conditions.

The importance of conservation genetics for deep sea fishing in the Mediterranean

Dr.ssa MARINA ROLDÁN - *Biology Department, University of Girona, Spain*

The violet lobster, *Aristeus antennatus*, is one of the most important species that can be caught in the Mediterranean sea, especially in the Western basin, where it can be found in abundance. Moreover, he Aristeus antennatus is the Mediterranean species that has the widest bathymetric distribution, since it is present at a depth of 200 to 3,000 meters. It has been observed that it migrates along coastal underwater canyons. The importance of such species is due to its high quality, as recognised by Italian cooking traditions.

During the last forty years, the violet lobster has been caught at a depth of 300 to 700 meters. Recently, the discovery of the Aristeus antennatus at deeper levels – more than 1,000 meters in depth - has raised the concern of marine biologists.

In 2006, we started a research project, whose main objective is to know the species genetic variability; the results should also provide useful information about the stock *"genetic health"*.

The so-called virgin stocks and those affected by the fishing activities are genetically homogeneous. Such connection is due to the periodical vertical migrations in both ways and at different times of the individual development. It might be inferred that the vulnerability of the Aristeus antennatus would increase with the progressive bathymetric expansion of fisheries.

In recent years, for the first time in the history of biology, the conservation of our planet and of its biodiversity has become a priority issue in the media and, consequently, fishing in the Mediterranean basin has been banned at depths more than 1,000 meters.

The scientists concerned with the protection of marine species and, in particular, of the *Aristeus antennatus* can feel relieved by the fact that the *"virgin"* stocks are safeguarded. Sensible fishery management policies in the Atlantic and Western and Eastern Mediterranean basins have been conceived in order to grant the species sustainability in the medium run.

Observatory on the Ecology and Health of the Mediterranean Ecosystems (OESEM)

Dr.ssa FRANCA SANGIORGIO e **Dr. FRANCESCO LEFONS** - *University of Salento*
Ecotekne Centre

At present human societies use more than 25% of what green plants produce in biosphere and, in industrialized countries, they make their consumptions by burning an amount of energy of fossil fuels equal to 1% of the whole solar energy of national territories. The direct consequences of these consumption rates are:

1) loss of biodiversity, 2) pollution, 3) increase of carbon dioxide amount in the biosphere and global warming.

The main drivers of matter and energy consumption inside the biosphere are industrialized countries; but, in general the improvement of the standard of living and the increase of wealth in developing countries will cause a remarkable increase of consumption of biosphere in the next dozen years. However it is clear that our biosphere cannot stand a consumption increase, and therefore the western model of economic development should be revised so as to reach real eco-friendly compatibility.

This path calls for radical changes to the behaviors, an adequate information and communication campaign as an unavoidable tool to challenge a way of thinking and, as a consequence, modify the behaviors of the society.

The Observatory on the Ecology and Health of the Mediterranean Ecosystems ***(OESEM)*** was established in this framework as a structure belonging to the University of Salento with its seat at the Lighthouse of Punta Palascìa a Otranto *(LECCE)*. The Lighthouse Palascìa, is an ancient vedette on the Mediterranean sea, located on the most beautiful and unblemished area of Otranto *(40°7' N, 18°31' E)*, along the Otranto - Santa Cesarea coast road, and is among those lighthouses that because of their history, position and culture stand as symbols of the Mediterranean sea: natural antennas projected towards the sea for the dissemination and circulation of ideas. Built in 1867 and then used as a real lighthouse in the 70s, it was abandoned for almost thirty years and then restructured in 2004; in December 2008 the operational seat of the Observatory was inaugurated here.

As far as ecology-related issues are concerned, the Observatory on the Ecology and Health of the Mediterranean Ecosystems was established with a twofold objective: to widespread an environment-friend culture and promote the awareness of our biological role as a species capable of modifying for better or worse the balances, the goods and services of ecosystems. The activities carried out in the Observatory are destined at:

1. increasing the interconnection between scientific research, the administrators and the users of goods and services of Mediterranean ecosystems;

2. recovering, organizing and offering existing knowledge;

3. identifying and experimenting the most suitable journalistic and multimedia tools to widespread

the right scientific information about the mechanisms that regulate the health of Mediterranean ecosystems among citizens and authorities so as to enhance their usage and management potential;

4. experimenting, producing and offering environmental educational tools.

Lighthouse of Palascìa *(foto di Elio Paiano)*

The Observatory also features a multimedia museum that from January to November 2009 will host an exhibition on *"Lagoons and development in the societies of the Mediterranean area"*, which describes the co-evolutionary process occurred in the Mediterranean basin between the man and this particular kind of water ecosystems.

The exhibition shows some of the most important lagoon systems of the Mediterranean sea, from the lagoon of Venice to those of Amwrakikos, from the lagoons of Rome to Mar Menor, to the lakes of Alimini to the lagoons of the delta of the Po river, by describing its sustainable usage over centuries by local communities, the natural beauties, present risk factors that jeopardize its health, the initiatives to protect and recover it.

Towards a sustainable nautics: the evolution and environmental impact of Antifouling Paints

Prof. CARLO PRETTI - *University of Pisa - Department of Animal Pathology, Prophylaxis and Hygiene of food*

The International Marine Organization - **IMO** - defines as antifouling paints those paints that are used on boat bottoms to prevent the settlement of encrusting organisms like algae, shellfish, mollusks and others that slow down the boat and increase the fuel consumption.

These products are able to meet different conditions: effectiveness, wear, cost and last but not least, the environmental impact. The most widespread technique used to prepare these paints is that of formulating films capable of dissolving biologically active chemicals. Their toxicity may inhibit the deposit on underwater structures with a repellent or lethal action on settling *(target)* and non-target organisms.

The environmental consequence of the pouring of biocide substances making these paints is highly felt in limited coastal marine areas such as gulfs, tourist and merchant harbors where the naval traffic is high.

The evaluation of the environmental impact of antifouling paints has been accelerated after the enactment of the ban of traditional products made of organotin compounds like tributyl tin *(TBT)*: the introduction of self polishing copolymer *(SPC)* paints has certainly highlighted the occurrence of a real environmental emergency linked to antifouling products. Here, the matrix binder is made of two polymers united by a metal like tin.

The bond between the two polymers is broken with the hydrolysis occurring when this initially soluble co-polymer is put into an alkaline environment, as in the sea; the sub-products then become soluble; then the paint film releases the biologically active products, like the tin compounds and other biocides present in the formulation, that have a high antifouling effectiveness and whose wear depends on the film thickness.

The organotin compounds such as the TBTO *(tributyl tin oxide)* are highly toxic and cause acute and chronic toxicity phenomena, hormonal troubles, and, given their persistence, may be accumulated on sediments and in the food chain of the marine ecosystem.

The uninterrupted occurrence of scientific surveys proving the toxic effects on marine organisms, the damage brought to mariculture and ascribable to the dispersion of antifouling products have spurred IMO to act and limit the usage of organotin compounds and, later, prohibit them, starting from 2003, by foreseeing the total removal of this kind of paint from bottoms starting from 2008.

At present the following antifouling paints are available:

COPPER-BASED ANTIFOULING PAINTS: they are divided into different categories and the most widespread are defined as: self-eroding, ablative, CDP - controlled release of polymers and the so-called self polishing paints. In general, the effectiveness of these products entails the release into water of certain levels of copper ions that may be more or less high depending on the kind of matrix used, and may have resins formulated to induce some specific chemical reactions *(i.e. saponification, hy-*

drolysis), while others may fit some more natural processes enhanced by the lightly alkaline environment of the sea. Copper is a metal that is present in biological systems and may become extremely toxic if the internal balance-keeping mechanisms are not able to face the increase of its concentration.

The concentration levels of copper in the environment are increasing because of industrial, agricultural and urban dumping; i.e. some studies show that the total emissions of copper in water have increased threefold between 1950 and 1980, turning this metal into a possible harmful substance for water animals. The main toxic effect of copper, that is different according to the species, is the production in organisms of species that react to oxygen *(oxidative stress)* that may harm the DNA.

The sensitivity to copper of the different biological indicators is different: unicellular algae, bacteria > shellfish, anellids > fish > clams > macrophytes.

The need to limit the presence of copper in the sea is then justified and to reduce its release strengthening biocides, or additional biocides, or co-biocides have been added to the formulation. They act in synergy with copper and increase its antifouling performance, prolong their effectiveness and help limiting the emissions of Cu. Some of the most commonly used products are weedkillers and fungicides that are normally used in agriculture: diuron, triazines, isothiazolones, pirition zink and others. The usage and dissemination of these agents, even if approved by agencies like the American EPA *(Environmental Protection Agency)*, creates some perplexity: indeed, they proved to be very resistant and of a high environmental impact.

SILICONE-BASED ANTIFOULING PAINTS: these paints are an alternative to biocide-based paints since they hinder or reduce the marine fouling of the bottom, also depending on the speed *(speed >15 knots)*, and the possibility of frequent manual removals. Silicone-based paints have long been used for the underwater parts of some naval ships and submarines.

However, while the removal of hard fouling, like the dog's tooth *(Balanus amphitrite)* is easy, the viscid fouling of diatoms and spirographs, is not as easy, notwithstanding the speed.

Last, since the price of these paints is high, they have largely been used only for military ships and very fast boats. Since they do not contain biocides they should have a very limited impact on the water environment, however it seems that some non-ionic tensides are mixed in these paints to reduce the surface tension of water; they belong to the class of alkilphenols and according to the EU, their dispersion in the environment shall be reduced in the next few years because of the effects they have on the endocrine system of animals.

ANTIFOULING PAINTS MADE OF NATURAL BIOCIDES: in order to limit the eco-toxicity of biocides, different kinds of natural biocides have been identified; they are mainly divided into two categories: one including the substances that many marine organisms *(algae, sponges or dolphins)* use to protect themselves against the fouling, while the other category of *"natural biocides"* is made of substances extracted from vegetable or animal organisms that do not use them as antifouling substances.

Their commercial appeal should be that of a lower environmental impact since, theoretically, they are more biodegradable, even if the scientific literature is poor on the matter. However, some practical tests did not result in encouraging data: probably, biocides are too much degradable and they loose their effectiveness during the various handling processes.

The "Diffused Museum": a Mareamico project

Dr.ssa MARIA DOLORES LARVA - *Scientific advisor - TELERAMA*

A dive in the Apulia sea can unfold unexpected, mysterious and charming scenarios, when you go hunting for lost civilisations.

When you dive to explore the depths of this sea, the sight before your eyes opens and delights your mind, which is enraptured not only by biodiversity richness, but also by a universe filled with treasures, all of them waiting for someone to hear their many tales.

If you let yourself go with emotions, you can discover another past dimension.

It is a past often ignored, sometimes even violated and pillaged by people with no scruples, who try to sell stolen archaeological finds illegally to antique markets.

In order to contribute to the enhancement and development of an educational strategy, Mareamico throws down the gauntlet, and brings the treasures hidden in the depths of the Apulian sea to the forefront by putting forward innovative, didactic and popular projects on sub-aquatic archaeology.

This is an ambitious goal, which will not be simply based on communication, but also on protection, enhancement and exploitation of sites. More specifically, the spotlight will be on those that have so far received poor attention, or that have been involved in illegal traffics – all reasons which archaeologists nor administrators cannot be blamed for.

In consideration of what has just been said above, a light was switched on down into the depths of the sea facing the towns of Torre Sinfonò and Mancaversa. Two among Southern Italy most important archaeological sites were found here in the past years, and later on they fell in the sights of unscrupulous art dealers. Some of the seized amphorae are of Greek-Italic origins and still pitch waterproof.

Moreover, all of them trace back to the Romans. This shows the Romans looked for new commercial horizons, enhancing circulation of very large quantities of wine, oil and other foodstuffs after the terrible Punic wars, at the end of the 3rd century BC. However, there are still thousands of containers lying deep down, on the seafloor facing the town of Alliste, waiting to be recovered.

If taking depth and high recovery operation costs into account, a different kind of intervention would probably be the

best option - ideally, it should allow the possibility of diving into the abyss of history and exploring the exciting mysteries of this archaeological area.

It is for this very reason that Mareamico has concentrated its efforts on making archaeological goods more available, thanks to different kinds of technologies and advanced information, communication and advertising services. All of this is part of a project aiming at exploiting and define a tourist and cultural offer which is worthy of this extraordinary heritage.

Three separate journeys have been planned, from diving to getting into a *"video-boat"*, where a guide will illustrate the seafloor naturalistic, historic and archaeological features.

Moreover, monitors will be installed, broadcasting live images of the archaeological area.

These images will be filmed by scuba divers or by some observation cameras that will continually broadcast everything that happens all around the shipwreck of Torre Sinfonò.

Amphorae seized by the police force together with finds to be collected for research will be showed at the Castle of Felline, where a centre to receive students, tourists and visitors, will be set.

The project includes online archaeological journeys and will be acknowledged as the origin of the first ***"Diffused Museum"*** in the Apulia sea.

VALERIO CLERI

Valerio Cleri is a the top of the world long- distance swimming, 4th at the Beejing Olimpic Games (10 km), became European Champion in 25 Km race, hold in Dubrovnick in september 2008.

Valerio CLERI
Born in Palestrina on june 1981, the 19th.
Heigh 177 cm, weight 76 km.

Mareamico's award is yearly conferred to an Athlete specially committed in a sport bound to the sea of for his love to the sea.