

Marine invasive species advance 50km per decade

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A rapid, climate change-induced northern migration of invasive marine is one of many research results announced Tues. Nov. 11 during opening day presentations at the First World Conference on Marine Biodiversity, Ciudad de las Artes y las Ciencias, in Valencia.

Investigators report that invasive species of marine macroalgae spread at 50 km per decade, a distance far greater than that covered by invasive terrestrial plants. The difference may be due to the rapid dispersion of macroalgae propagules in the ocean, according to Nova Mieszkowska, from the Marine Biological Association of the U.K.

The international conference Nov. 11-15, organised by the Spanish Council of Scientific Research (CSIC) and the European Network of Excellence on Marine Biodiversity MarBEF will gather over 500 scientists from 45 countries.

Says CSIC scientist Carlos Duarte, co-chair of the Conference: "Overwhelming evidence of an accelerating deterioration of the oceans has provided the ímpetus to call the marine biodiversity scientific community together in this first World Conference."

According to Duarte, the convergence of pressures on the ocean is leading to a global erosion of marine biodiversity "where climate change may deliver the coupe de gráce for a catastrophic collapse."

"The impacts of the pressure of climate change are particularly dramatic,

according to results presented at the Conference, in the abrupt deterioration of the Arctic and coral reefs" Duarte asserts.

Almost half of the 450 communications at the Conference will address the loss of marine biodiversity and its consequences, whereas the rest will cover the exploitation of marine living resources, as well as exciting discoveries of novel ecosystems in extreme ecosystems, particularly in the deep sea.

DISCOVERIES IN THE DEEP SEA

Deep sea research has increased greatly in the last decades thanks to technical developments like submarines, remotely operated vehicles (ROV) and autonomous vehicles (AUV). One of the coordinators of the deep sea program in Spain, CSIC researcher Eva Ramírez, is studying the hydrothermal vents which, discovered in 1977, are one of the principal discoveries of modern oceanography. These submarine volcanoes sustain high densities of fauna which, with specific adaptations, live independently of solar energy.

"Since their discovery, more than 500 hydrothermic vent-species have been described, most endemic, as well as 200 cold water seep species and 400 morphological species of chemosynthetic ecosystems which form on the carcasses of whales," points out Ramirez.

For instance, on the mud volcanoes in the Cadiz gulf 13 new species of polychaetes (marine worms) are described as well as a new genus, *Bobmarkeya* that, due to his characteristic appearance, owes his name to Bob Marley.

During the Conference, the result of collaboration between more than 160 expert taxonomists on the identification and description of marine species will be presented. Their goal: To complete a database before

2010 which describes all known marine life -- a world registry of marine species.

The Census of Marine Life, a collaboration of 2000 scientists in 82 nations, is also participating in the conference.

Juan Carlos Castilla, the scientific director of the International Laboratory on Global Change, of the CSIC and the Pontificia Universidad Católica, will present his alternative to protected marine reserves. This focuses on units of fishery management, based in administrative concessions to cooperatives of fishermen who evaluate the sustainability of ecosystems. The responsibilities of these collectives have been more efficient to maintain the ecosystems than traditional marine protected areas, Castilla says. He explains that "as there is no private property in the sea, all being common property, none of the actors involved in exploitation take responsibility for marine resources."

Castilla's model has been the basis to develop innovative components of fisheries law in Chile and, under Castilla's supervision, is being developed for implementation in other countries, such as Japan.

UP TO 1 BILLION NEW SPECIES OF BACTERIA

Carles Pedrós-Alió, a CSIC researcher at the Insitito de Ciencias del Mar (Institute of Marine Sciences) in Barcelona, is leading the way in the discovery of new taxons of marine bacteria.

"While it is estimated that 100 to 1,000 million species of bacteria exist, only 6000 of them have been described, since most of them either have low abundances or show little biological activity. Thanks to the availability of sequencing techniques that are much cheaper, researchers have now begun to explore the largely undiscovered world of microbial diversity."

"The gene pool of these bacteria are one of the vastest resources of genes of the world," he adds. "We hope to find genes that can be useful to the pharmaceutical industry, medicine, the production of biofuels, bioremediation, etc. What's more, a greater understanding of this diversity, hidden until now, will help us understand better the evolution of life," explains Pedrós-Alió.

Daniel Pauly, of the University of British Columbia in Canada, will present a historical reconstruction of artisanal capture fisheries and will argue that sustainable fisheries are those that are carried out at a small scale. Although this type of artisanal fisheries does not show up in the international statistics, and has decreased over the past decades, Pauly says it is more common than assumed.

Rudolf de Groot, of Wageningen University, the Netherlands, puts a price tag on the benefits derived from the protection of coastal ecosystem. He has calculated that effective protection of 20-30% of coastal ecosystems costs between 5 and 19 billion dollars per year, but can generate benefits in terms of improving the surrounding fish stocks, exceeding the costs. As the actual expenses to maintain the currently unsustainable fishing industry are between 15 and 30 billion dollars per year, the Dutch researcher estimates that creation of the network of Marine Protected Areas would be a more efficient way to boost the fishing industry than the direct financial assistance they now receive.

CSIC scientist Nuria Marbà will present results that demonstrate that the recent invasion of the Spanish Mediterranean by the invasive algae *Lophocladia lallemandii* is leading to a steeper seagrass decline in the Mediterranean coast. According to Marbà, "the invasion of *Lophocladia* increases seagrass mortality by five fold".

The paleogeographic study of the historic processes leading to the present distribution of species in the African coast, the impact of the

collapse of ice shelves in Antarctica, or the impacts of the acidification of the Southern ocean are among the issues that will be discussed at the Conference.

Source: Census of Marine Life

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