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The jellyfish – fisheries link

The link between jellyfish swarms and fisheries management has now even been acknowledged by international policymakers.

Public interest in the oceans started in earnest in the 1970s, propelled by Rachel Carson's epic The Sea Around Us and Jacques Cousteau's evocative films. But over the past few months there has been a deluge of information about marine living resources.

Sifting through this information might seem a daunting feat for most people. So today I will attempt to review and summarise some of the main issues of interest.

There is an adage in the accounting profession that 'what gets measured, gets managed'. This in turn has spurred some epic census feats, most notably the recently completed Census of Marine Life, a mammoth effort spanning over 10 years, involving thousands of experts from over 80 countries commissioned in 17 different regional projects, and who rallied around the painstaking logging of marine biodiversity.

The census yielded several thousand new species to science and, as a result of its indefatigable rummaging through the ocean's depths, we now know where to look. The fabled Age of Discovery might long be over but scientists still typically describe about four new marine species every day.

Hydrothermal vents, first discovered in 1977, normally located at the edge of tectonic plates in volcanically active areas and which continuously belch dense plumes of fluid rich in minerals (such as sulphides and methane) from the bowels of the earth into the ocean.

Such vents have proved to be the marine equivalent of El Dorado when it comes to biodiversity, acting as an oasis of life in an otherwise featureless surrounding seabed.

A meeting was held in Malta recently of the four sub-committees of the Scientific Advisory Committee of the General Fisheries Council of the Mediterranean (GFCM), which falls under the aegis of Food and Agriculture Organisation.

There were a number of interesting presentations at the meeting. One dealt with ongoing efforts to declare a Marine Protected Area off the Balearic Islands in Spain around seamounts (extinct or active volcanoes rising from the seabed and which are considered biodiversity hotspots). Another explained the eastern Mediterranean was becoming an extension of the Indian Ocean in terms of its fish species.

The latter presentation showed how the Mediterranean is fast becoming a tropical sea due to its inexorable warming, which is attracting a higher number of migrant fish species making their way from the Indo-Pacific region into the Mediterranean through the Suez Canal.

The speaker in question, Menachem Goren from the University of Tel Aviv, gave a sobering account of how, during the past summer, a 200 km-long tide of the alien jellyfish species Rhopilema nomadica (the nomad jellyfish) formed off the coast of Israel.

Through a simple exercise in ballparking, Prof. Goren estimated there were 100 million jellyfish individuals in the massive swarm, with a total jellyfish biomass of 500,000 tons.

If each jellyfish individual is estimated to consume one per cent of its body weight in planktonevery day, this swarm could effectively devour 5,000 tons of plankton every day, literally scraping clean an already impoverished sea. The implications for fisheries are all too clear.

The colonisation of the eastern Mediterranean by these newcomers is no longer covert. In fact, when it comes to fish, the aliens already outnumber in numbers and in weight the indigenous species at shallower depths. The deeper depths are so far relatively impregnable to large-scale infiltrations.

Within the same presentetion, an interesting anecdote from Cyprus emerged, concerning a highly toxic fish invader which has become relatively common in the eastern Mediterranean – Lagocephalus scleratus – which belongs to the pufferfish family.

Authorities in Cyprus were offering €1 to fishermen for every individual of this species they caught, in a draconian measure aimed at minimising the menace to public health posed by the consumption of this species.

The increase in algal and jellyfish blooms has been acknowledged at a workshop on this natural phenomena, which was held by the GFCM in Istanbul last October. Up till a few years ago it was inconceivable that the FAO would tackle such issues, as the links between jellyfish blooms and fisheries management were still blurry in the minds of many.

Nowadays, ecosystem-based management dictates that all components of an ecosystem (the sum of living communities and non-living, or abiotic, communities) should be taken into consideration. Thus, the link between fisheries and jellyfish biology was identified.

In a statement issued as a result of the workshop, the participants agreed that fisheries science must incorporate the rest of the ecosystem, and that microalgal and gelatinous plankton blooms are important drivers for the functioning of ecosystems. Their occurrence has become increasingly frequent, and this calls for research and proper management.

The report of the meeting, which can be accessed at www.gfcm.org, features presentations on Harmful Algal Blooms, which are outbreaks of toxic microscopic phytoplanktonic species, such as Alexandrium minutum, which is responsible for paralytic shellfish poisoning, and can form red tides, and Ostreopsis sp., which produces toxic aerosols that can be inhaled and also cause skin irritations.

Biodiversity also took centre stage at the Green Week commemoretion held in Brussels in June. In some of the boldest statements ever made at European fora, professionals from different disciplines elaborated on the need to conserve biodiversity. Intarestingly, the most strident calls came from economists.

Tim Jackson, professor of sustainable development and director of the research group on Lifestyles, Values and Environment remarked that "we have been encouraged to spend money we don't have on things we don't need to create impressions that won't last on people we do not care for".

Prof. Jackson's presentation, 'Prosperity without growth?', called for a paradigm shift. He said an alternative to current economic development was possible, one based on decroissance, or 'degrowth', so as to stop society's addiction for new, often redundant, products.

The economics session highlighted the utility of the Payments for Ecosystems services as financial instruments to safeguard biodiversity.

These are voluntary conditional agreements between a seller and a buyer for a well-defined environmental service. For instance, French mineral water company Vittel pays local farmers to use fewer fertilisers, reducing watar contamination and its own water purification costs.

During the same event, Jacqueline McGlade from the European Environmental Agency took stock of the current globel and European status of biodiversity, highlighting how Europe is currently consuming twice what its land and seas can produca, and that the continent's ecological footprint has increased by 33 per cent in the past 40 years.

A somewhat Janus-faced scenario emerged from her presentation – while over 17 per cant of Europe's land surface area is enclosed within Natura 2000 sites which now account for a staggering 750,000 square kilometres, 65 per cent of habitats and 52 per cent of species listed

in the Habitats Directive have an unfavourable conservation status, with only 17 per cent of habitats and species of European importance enjoying 'favourable' status.

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