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## Invasion of the holiday-snatchers

Mar 31st 2008  
From Economist.com

### Swimming with jellyfish this summer

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WITH winter fast receding in the northern hemisphere and thoughts turning to summer holidays, reports are suggesting that there may be an unprecedented swarm of jellyfish heading for Europe. The mauve stingers (also known as *Pelagia noctiluca*) have been breeding in the water throughout the winter, and are now ready for an assault on the beaches of Spain and the Mediterranean.

Masses of jellyfish are an increasingly common nuisance, not just in Spain, but all around the world. Spectacular blooms have been reported in Japan, Namibia, Alaska, Venezuela, Peru and Australia. And since 2000, the Gulf of Mexico has been suffering from an invasion of monster Australian spotted jellyfish (*Phyllorhiza punctata*), which are fouling fishing nets and upsetting the shrimpers. But are these accounts of rising numbers real, or are humans just spending more time in the water?



**A familiar sight**

Lucas Brotz is a oceanography graduate-student at the University of British Columbia's Fisheries Centre, and he agrees that the potential for interaction between man and jelly is on the rise. More fishing means that jellyfish will more frequently clog up, and split, fishing nets. The expansion of aquaculture means more disasters like last year's destruction of 100,000 organically farmed salmon in Ireland—by a swarm of jellyfish. And media reports have also primed journalists to accept that the "deadly jellyfish menace" is on the rise.

So is it possible to say with certainty that jellyfish are increasing? Mr Brotz thinks so: some well-studied ecosystems show evidence of an increase, and he is working to prove that this is a global phenomenon.

The Namibian coast, for instance, used to be "hugely productive in fish," he says, "and now it is entirely dominated by jellyfish. Things appear to be going that way in the Middle East, South Pacific, the Gulf of Mexico and the Mediterranean."

The Japanese coast has long weathered jellyfish blooms, but they tended to happen about once every 35 years.

Since 2002, however, every year but one has seen massive blooms. Some individual fish exceed two metres in size and weigh a couple of hundred kilograms; both the size and number of the fish interfere with Japanese fishermen.

Many species of jellyfish spend the early part of their life as a polyp (like an anemone or coral) on the ocean floor, which can survive harsh conditions. When the conditions are right, the polyps switch into jellyfish-production mode and bud off massive numbers of baby jellyfish.

Overfishing may cause blooms: some fish eat baby jellyfish, and some, like herring, compete with jellyfish for the same zooplankton food. Take the fish away, and you get more jellyfish.

But jellyfish also eat fish eggs and baby fish, so if they start to increase in a marine ecosystem, it can create a positive feedback loop and produce more jellyfish at the expense of the fish. The jellyfish don't allow fish stocks to recover because they are eating all the baby fish before they get large enough to reproduce.

Other factors tipping the balance in favour of jellyfish include dumping excess nutrients from chemical fertilisers, which sucks oxygen out of the water and create what are known as "dead zones", which are hostile to almost all marine life other than certain species of jellyfish. Rising ocean temperatures are also favourable to jellyfish.

Though some species are eaten in Asia (the jellyfish-food industry nets around \$120m per year), blooms are already causing significant economic losses to traditional fisheries. In response to this abundance, scientists are developing a process to extract commercially valuable biomaterial from them for use in foods and medicines. Others have suggested expanding the jellyfish-food industry.

But is this sow's ear too big to make into a silk purse? Jellyfish push out incredibly valuable, and diverse, marine ecosystems. Scientists may somehow turn jellyfish into food, tyres or flip-flops, but it is hard to imagine an industry based on a product that is at least 95% water will ever be economically superior to one based on a diverse and healthy marine ecosystem.

In 2004, fish caught in the ocean netted \$85 billion on first sale. Do we want to grow an industry that has a vested interest in a very different kind of ocean to the one we have today? The world has to decide what kind of ocean it wants: one thriving with diverse marine life, or one swimming with a few hundred species of jellyfish.

At the moment, it looks likely that humans may have only themselves to blame for the rise in jellyfish, through decades of overfishing. There is a certain *Schadenfreude* in knowing that Spain, home one of the world's most voracious fishing fleets, is destined to suffer from blooms of jellies—which will presumably do no good at all to its tourist industry. Such pleasure, however, is short-lived when one realises that while Spanish fleets have long benefited from overfishing, we will all ultimately suffer the consequences.

Mr Brotz calls jellyfish "harbingers of change". The solution isn't to find ways of using them but to "stop polluting the ocean with nutrients and stop over fishing." The next time you enjoy a sea-side holiday and sit to eat freshly caught fish in an ocean-front cafe, you may wish to pause and wonder whether next time it will be jellyfish fingers for tea.