

06.18.19 | WORLD CHANGING IDEAS

Hope you like to eat jellyfish, because they're taking over the oceans

As jellyfish continue to thrive in oceans around the world, causing destruction of property and other sea life, scientists are trying to find uses for the gooey creatures—everything from chips to skincare, and even diapers.



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BY TALIB VISRAM LONG READ

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THE RECOMMENDER

Salmon farmers in Northern Ireland could only stand aghast one autumn morning as they watched their entire stock—100,000 plump Atlantic salmon—wipe out within hours.

The Irish Sea water glowed red that day in 2007 with what the farmers described as “billions” of jellyfish, engulfing a space of 10 square meters, 35 feet deep. The farm’s boats practically jammed as they tried to trudge through the throng of unwelcome intruders. Over the following hours, the entire inventory of Northern Ireland’s [then-only salmon farm](#), \$2 million worth of fish, was obliterated. Some died of stress, many suffocated under the pressure of the battling boats, and the rest were stung to death.

The “mauve stingers,” a species native to the warm Mediterranean Sea, weren’t supposed to exist at all in the colder British waters, but they followed a now-recurrent pattern—slippery, alien-like blobs

without brains, hearts, or blood suddenly mushrooming in population and overrunning the Earth's waters.

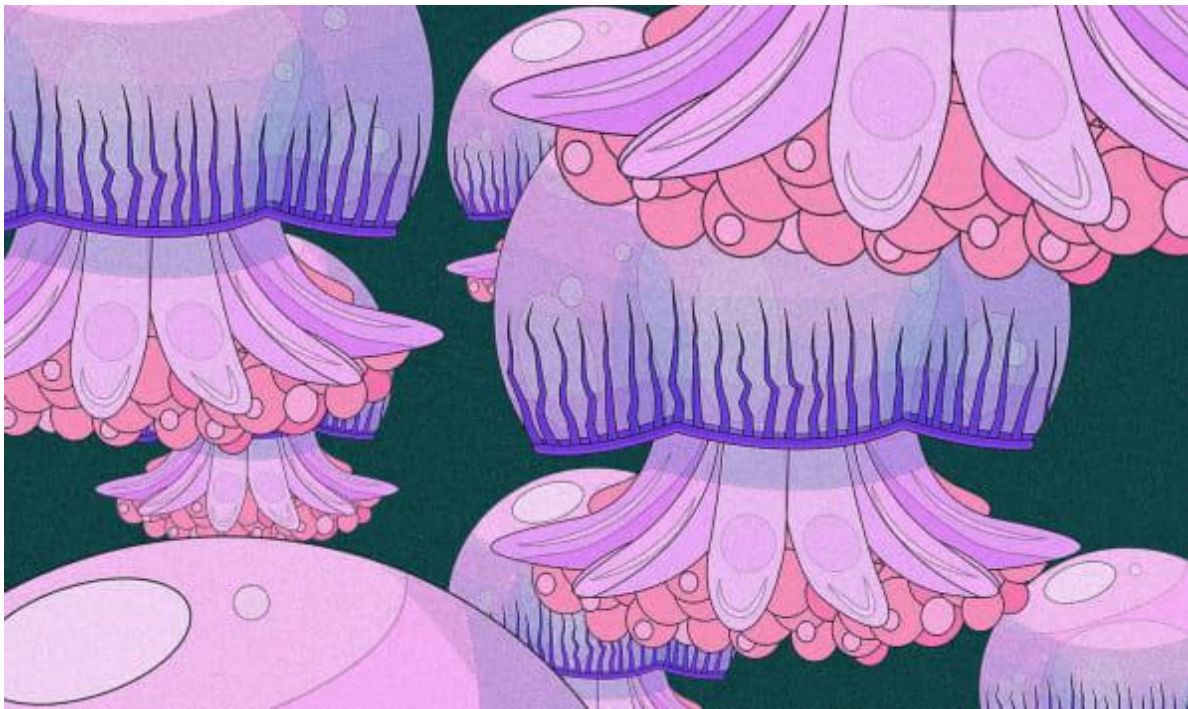


[Source Image: VikiVector/iStock] Jellyfish are not a new marine phenomenon: The gelatinous creatures have existed since the dawn of time, an estimated 550 million years ago. But because of human environmental activity, which has led to warming and polluted seas, jellyfish are thriving where other marine life cannot—and their continued success could eventually swamp our seas.

That's bad news for more than a few trades. Jellyfish have ripped fishing nets and capsized trawlers, entirely derailing fishing industries. They've clogged cooling systems of nuclear plants from Sweden to the Philippines, where the power plant shutdown even raised suspicions of a political coup. They terrorize tourist spots: The same mauve stingers have proliferated in their Mediterranean home and leave burning welts on the skin of thousands of swimmers every year on the beaches of Ibiza, Sicily, and beyond.

And, perhaps most worryingly, they're fundamentally dismantling natural food chains, both in their own ecosystems and in foreign ones as they invade new territories and find snug second homes. Scientists are warning that, to keep the tilting system in balance, we may need to

use jellyfish in novel ways. We may need to eat them, beautify ourselves with them, and dress our babies in them.



[Source Image: VikiVector/iStock]

THE ALIEN SURVIVOR OF THE OCEAN

In May, the UN released a [landmark report](#) stating that 1 million species are in threat of extinction, “many within decades, more than ever before in human history.” For marine life in particular: The UN projected that, in a high-climate warming scenario, the world’s fish biomass could decrease by up to 25% by the end of the century.

While most species are suffering, jellyfish appear to be not only impervious, but flourishing. Lucas Brotz, a jellyfish scientist at the Institute for Oceans and Fisheries at the University of British Columbia, studied [45 marine ecosystems](#) around the world, from the East China Sea to Hawaii, finding population increases in 62% of the communities and decreases in only 7%. “There is high confidence and good data to support that jellyfish blooms are increasing,” Brotz says. While most blooms are not dramatic, Brotz says some may contain millions of jellyfish.

Creatures that have lingered on Earth as long as jellyfish—Brotz says they've been around longer than any other animal we know of—have built incredibly robust survival mechanisms. Though they appear wispily delicate, they've survived all of the mass extinctions. They look extraterrestrial because they're the best example of an alternative form of biology. "If you were to imagine life on a different planet, jellyfish are a pretty good example of that," Brotz says. "Without having aliens to study, they may be the next best thing."

Unlike other sea life, the spectral beings can thrive in higher temperatures. More warm months per year as a result of global warming bring longer jellyfish seasons. "Jellyfish are showing up earlier and sticking around longer," Brotz says. And they're taking up more ocean space. The notorious box jellyfish, for instance, which packs a painfully venomous sting, were formerly only prevalent in the Indo-Pacific waters around Australia, but are now moving farther south where it's no longer too cold for them to survive and breed.

They can also breed in water that's polluted and largely devoid of oxygen. And, even when the conditions aren't ideal, they don't simply wither away, says Brotz: "They can become dormant, and sort of hunker down and wait it out."

When jellyfish do breed, they really go at it. A mature jellyfish may release tens of thousands of eggs. Some don't even need a mate to reproduce: Hermaphroditic polyps need only to attach to rocky substrate to asexually clone. One species is even able to cheat death. As the immortal jellyfish, native to the waters around Japan, sinks to the seabed to die, its cells regenerate into new polyps, which find their craggy structures and start reproducing all over again. More coastal development implemented by humans means more rocky material for the tiny polyps to cling onto as they spawn off baby jellies.

As other, less hardy wildlife migrate or die off in these adverse conditions, they leave less competition for food for the already adept predators. Off the coast of Namibia, it was overfishing that did the job, depleting the shoals of sardines and anchovies, which traditionally compete with jellyfish for hearty meals of plankton. That left the jellies in charge as the sole predators. "Jellyfish eat fish eggs and larvae, so

the fish populations can't recover," Brotz says. "It's sort of an alternative stable state where the ecosystem switches." Namibia is no anomaly. The UN report found that 33% of fish stocks in 2015 were being harvested at unsustainable levels.



[Source Image: VikiVector/iStock]

JELLYBALLING

The spike in jelly blooms has led organizations around the world to consider how to make use of the phantasmal creatures so that there's an economic incentive to limit their population through fishing. One way, quite simply, is to get people to eat them. While this may sound immediately nauseating to some, jellyfish have been eaten in China for centuries. Today, the demand is still high. Globally, says Brotz, jellyfish are more sought-after than clams, mussels, and lobsters.

A significant portion of the more than 400,000 tons of jellies harvested yearly, principally for Southeast Asian markets, is caught off the U.S. Eastern Seaboard. Golden Island International, in Darien, Georgia, is one of the processing plants that commissions local fishing trips and then ships the glassy grub to Asia.

On the shrimping off-season, Wynn Gale becomes a jelly fisherman, a “jellyballer,” who takes out his shrimping boat, the Blessed Assurance, to catch cannonball jellies, which have been deemed the fittest for eating due to a harder consistency. Gale says he hasn’t personally seen a recent increase in jellyfish, saying that “they’ve been plaguing shrimpers since the beginning of time.” But, with a growing Chinese population, the demand for exports is high. Jellyballing is Georgia’s third-largest commercial fishery.

Gale’s trawls usually fill his boats with 200,000 pounds of cannonballs a day during jelly season. Jellies are 95% to 99% water, so after they’re vacuumed off the boat, washed, cleaned, and separated, they have to go through a dehydrating process to make them edible.

The result, after it’s been exported to Asian plates, is a noodle-like substance that’s not hard yet not soft, a texture Brotz compares to that of al dente pasta. It’s served as a salad or soup, or tossed with sliced meat or vegetables. It’s formed into curls to make it more aesthetically appealing, and usually prepared with a smattering of soy sauce or sesame oil to enhance the otherwise bland flavor.

Though surrounded by the critters, Gale has never felt the urge to try them. Brotz has, many times: “Some have been delicious,” he says of certain recipes. “Some have been, frankly, disgusting.” Most westerners probably feel squeamish at the thought of ingesting slimy goop. Besides, the traditional Chinese preparation process of adding aluminum salts, or alum, to toughen the jellies—like in leather tanning—is not beneficial to the body and has been flagged as hazardous in large quantities by the UN and the European Union. A standard serving of alum-treated jellyfish contains 404% of the recommended daily intake of sodium, and an excess of alum intake is thought to deteriorate nervous system tissue and possibly even lead to Alzheimer’s.

That’s why a Danish biophysicist, Mathias P. Clausen, has been working to develop a more palatable snack, something like a jellyfish chip. His team uses the less-eaten moon jellyfish, distinguishable by the four “eyes” on the bell. (Except that the eyes are actually stomach pouches.)

It's a culinary challenge, says Clausen, given that jellies are only comprised of 1% organic material, so boiling them would disintegrate them. The key is to "reverse cook" by draining the gelatinous tissue—the jelly's jelly—of water. That's done by steeping the substance in alcohol to toughen it up. What results is a milky-white chip with a salty, seaweed-like flavor and a "unique crisp."

Clausen admits the jelly chips would appeal to a niche market, and his team hasn't yet mass-produced the item. It's a labor-intensive process for a snack that has very low nutritional value. It's 30% protein, but whether that protein is digestible is unknown. But a mere 36 calories per 100 grams of dried, salted jellyfish make it a hit with dieters. For Clausen, it's a step toward addressing a longer-term gastronomic challenge of rethinking the meaning of food in the age of climate change, and of convincing people that diets may soon have to adapt.

THE FUTURE JELLYFISH PRODUCT MARKET

Clausen's project is just one of many under research in partnership with [Go Jelly](#), a program that's brought together eight European nations and is fully funded by the European Union. The aim, says Jamileh Javidpour, an associate professor of marine ecology who's heading up the initiative, is to study an under-researched animal and understand the reasons for the bloom explosion. In Europe, there's been a well-reported growth of jellies on [Italy's Mediterranean coasts](#) (the Italian word for jellyfish, ominously, is *medusa*), and deep-sea jellyfish in the Norwegian fjords.

Go Jelly, based in Kiel, Germany, primarily wants to solve a problem with another problem: to reduce plastics in the oceans by catching them in filters made of jellyfish mucus. Some 8 million metric tons of plastic are thought to end up in the oceans every year. (Ironically, there have been reports of sea turtles, one of the few natural predators of jellyfish, ingesting plastic bags through mistaking them for their translucent prey.)

Again, the work is lengthy and painstaking. Theoretically, it involves scrupulously studying how mucus behaves and how to preserve it, because fresh mucus is expensive. Physically, harvesting the mucus

entails placing the jellies on top of a sieve and letting the goo dribble through. Then, designing a plastic-trapping net out of the gunk, and finally, placing the biological filters in wastewater treatment plants before the water is released into the environment.

Because only the mucus is used, Go Jelly is exploring uses for the rest of the anatomy. Some ideas in progress include using the umbrella and tentacles for soil fertilizers, pesticides, and anti-aging creams. Separately, a Wales-based company has begun manufacturing jellyfish collagen. And an Israeli startup, Cine'al, has produced toiletries like diapers and sanitary pads from jellyfish flesh due to its absorbent nature.

The notion of placing jellyfish on sensitive body parts is iffy even for the least squeamish, but it's another example of rethinking the world. Jellyfish, the barbed outcasts of the sea, have never been viewed as a resource, says Javidpour. But, by the end of 2021, she says Go Jelly's aim is to understand if the proposed products would be popular and cost-effective enough, and if so, to bring prototypes to market.

Brotz is skeptical. "If there's a huge bloom of jellyfish around, that's great," he says. "But if there's no jellyfish around, then are you having to now create huge aquaculture operations just to grow jellyfish that you need mucus from?" It could create a paradoxical need to breed more of them.

"I think it's okay to explore those options," he says. "But to think that it's going to solve our problem is probably a bit naïve." Brotz struggles to find a solution. "I think we may need to just adapt," he says. One thought is to develop predictive technologies to foretell a "bad jellyfish year" in a certain area, so authorities and residents would know to take preventative measures.

Ultimately, many scientists agree that prevention is better than a cure. "This is not what's going to solve the overpopulation," says Clausen of his jelly chips. "We need to take care of our planet."

JELLYFISH AND US

It's easy to vilify the jellyfish or paint them as pests. They're not aesthetically pleasing and would never even make the shortlist for a cute role in the *Finding Nemo* franchise. They're a turnoff for tourists looking to take dips without being gored. And some are genuinely dangerous. The [sea wasp](#), a box jelly, boasts wafer-thin tentacles so fiercely poison-packed that Australian scientists said they produce "the most explosive envenomation process presently known to humans." In South Korea, scientists developed a hunting tool—[killer robots](#) operated by drones—to quite literally shred uninvited jellies to pieces.

But they're not purposely malignant beings—they don't even have brains. Like any other animal, their instinct is to survive and, having outlived dinosaurs, they've had longer than any other species to perfect their evolution. When there's balance, they're a healthy and crucial part of the ecosystem. At this moment in time, though, the imbalance is concerning.

"We need to think carefully about whether we really want oceans dominated by jellyfish," Brotz says. "If we push in that direction—if we go too far—we may not be able to come back."

Link: <https://www.fastcompany.com/90362601/jellyfish-are-booming-because-of-climate-change-and-human-activity>