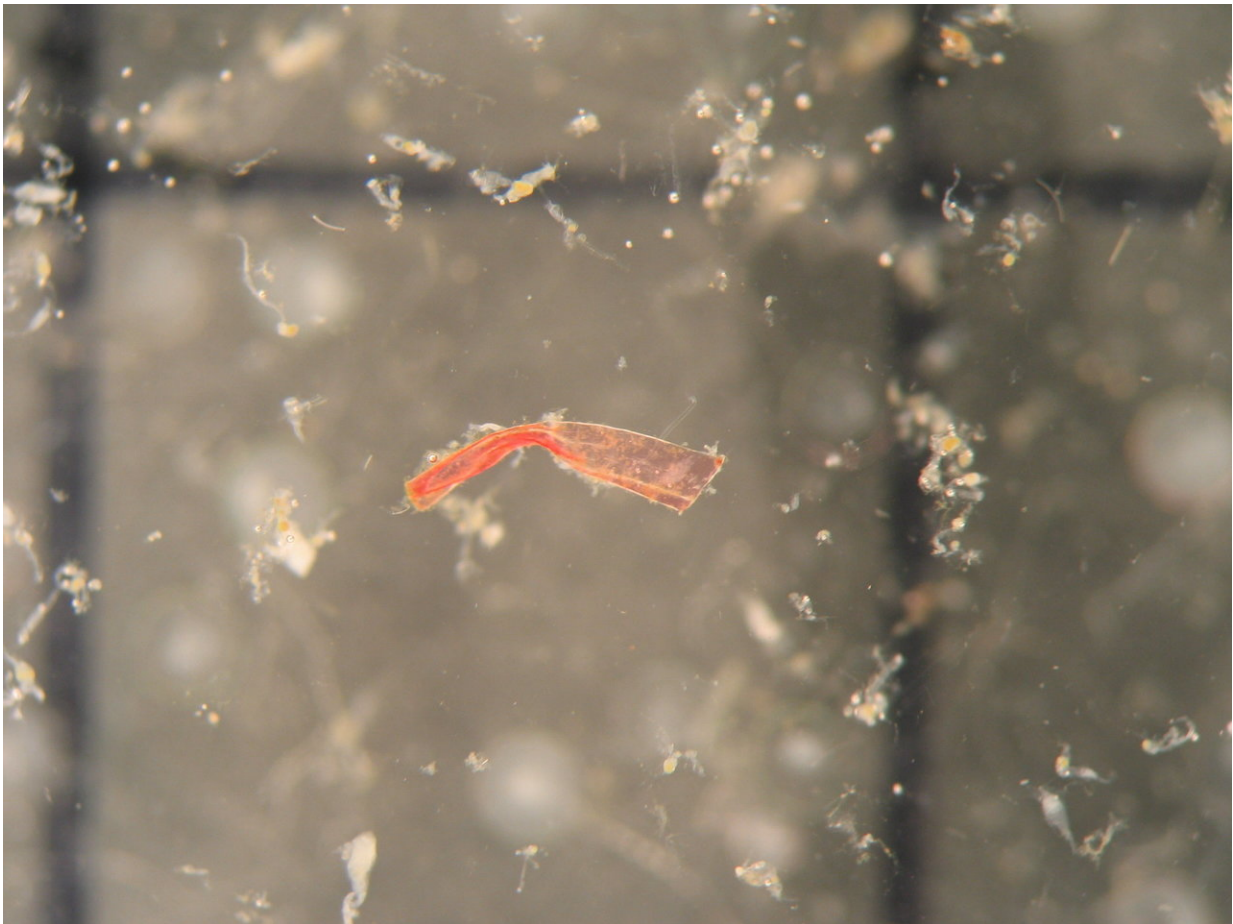


# Microplastics in the Baltic have not risen for 30 years

October 24 2017

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Microplastics are defined as being less than 5 mm in length. Credit: Sabrina Beer

The concentration of microplastics in water and fish from the Baltic Sea

has been constant for the past 30 years, despite a substantial increase in plastic production during the same period. This is the surprising conclusion of a new study just published in *Science of the Total Environment*.

More plastic is being produced globally than ever before, and between 5 and 15 million tonnes of plastic end up in the world's oceans each year.

It was assumed that the concentration of microplastics in fish and [sea water](#) had risen parallel to the increase in the production of plastic, but that assumption is not supported by the first long-term study of microplastics in the sea.

The study—by researchers at DTU Aqua, the University of Copenhagen, and GEOMAR in Kiel—analysed the level of microplastics in fish and water samples from the Baltic Sea, taken between 1987 and 2015.

"The result is surprising. There is the same amount of plastic in both the water and the fish when you go back 30 years," says Professor Torkel Gissel Nielsen from DTU Aqua.

Previous studies of the level of microplastics in water and fish have been snapshots. This is the first time levels have been studied over a longer period.

"The study raises a number of questions. We have all learned in school that plastic takes 100 years to break down. We know that more plastic is produced today than ever before. So where has the plastic gone? Does it sink to the bottom? Are there organisms that can break it down? Or is it carried away by currents?" says Torkel Gissel Nielsen.



A total of 814 herring and sprat were examined for microplastics levels. About one out of five fish had microplastics in the stomach or intestines. Credit: Sabrina Beer

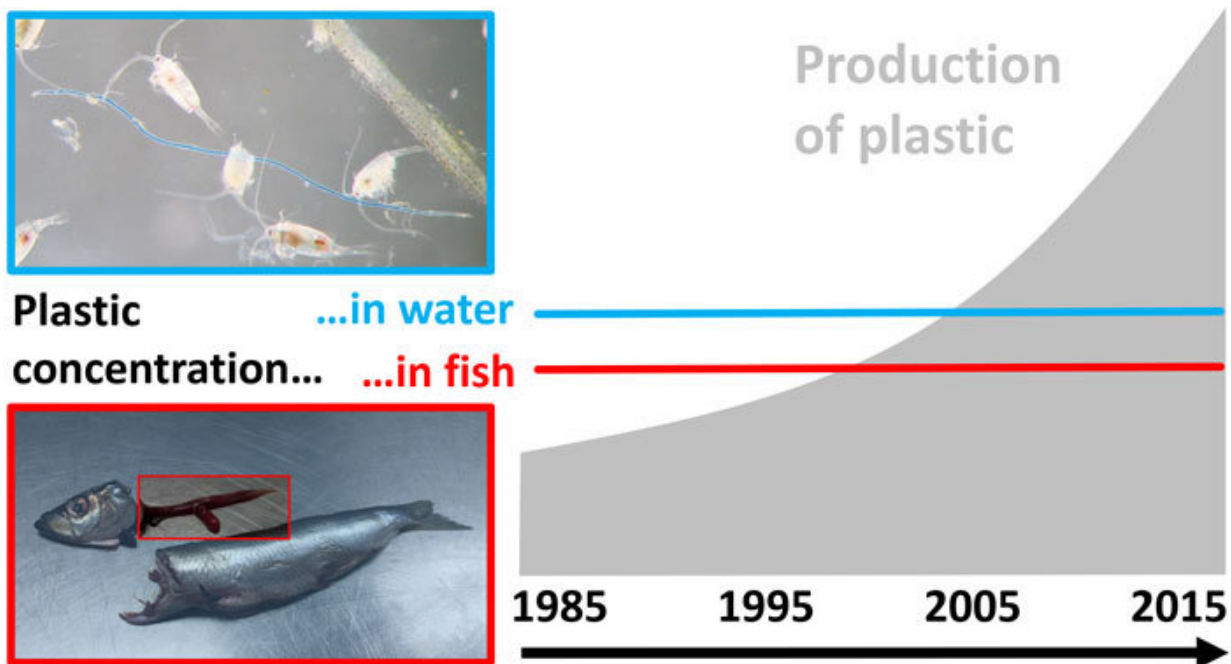
### **One in five fish contained microplastics**

The older water and fish samples from the Baltic Sea originate from a time series of samples collected by DTU Aqua and GEOMAR Kiel with the aim of investigating food chains in the Baltic Sea. Sabrina Beer, a master student at the University of Copenhagen's Biological Section at the time, developed the idea together with DTU Aqua of studying the microplastics concentration in the old samples.

She dissected a total of 814 fish of the species herring and sprat, and quantified the levels of microplastics in the stomach and intestines.

About one in five fish contained microplastics. These were primarily plastic fibres from clothing, such as fleece clothing, which are carried into the marine environment with discharged washing water. The researchers assume that the plastic passes undigested through the fish within 24 hours.

"It is important to focus on the fact that microplastics do not belong in the sea, and we still need to reduce their spreading so they do not end up in the aquatic environment and the food chain," she says.



Even though the global production of plastic has increased dramatically over the past 30 years, the concentration of microplastics in water and fish from the Baltic Sea has been constant during this period. Figure from Beer et al. 2017. Credit: Technical University of Denmark (DTU). Credit: Technical University of Denmark (DTU)

## Not overwhelmingly high levels

The quantity of microplastics in the water samples was not overwhelming. In one cubic metre of water from the Baltic Sea, researchers found 0.3 [microplastic](#) fibres (larger than 0.1 mm). A figure that has been constant over the last 30 years.

"There remains a need for a greater focus on microplastics in our seas. Our study paves the way for studying other aspects of the significance of microplastics, and levels of microplastics from the air to the seabed," says Sabrina Beer.

The largest threat to the environment posed by microplastics probably comes from their ability to attract toxic substances. Oil chemicals, brominated flame retardants, and phthalates can bind to the plastic. Whether these substances are absorbed by the fish, or the [fish](#) excrete the [plastic](#) before the substances are absorbed, is one of the questions which science has not yet answered.

**More information:** Sabrina Beer et al. No increase in marine microplastic concentration over the last three decades – A case study from the Baltic Sea, *Science of The Total Environment* (2017). [DOI: 10.1016/j.scitotenv.2017.10.101](#)

Provided by Technical University of Denmark

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