

Project *brief*

Thünen Institute of Fisheries Ecology

2021/06a

Investigations on the importance of contamination from dumped munitions in the Baltic Sea for bottom-dwelling fish species

Ulrike Kammann¹, Daniel Koske², Nicole Schmidt¹

- **Metabolites and explosives were detected in about 50% of individual fish from the dumping site.**
- **Fish in munition dumping sites are exposed to toxic chemicals and might suffer from that.**
- **Explosives were detected in fish bile but not in fillet (<4 ng TNT or -metabolites/g), indicating probably no acute problem for human consumers.**

Background and aim

German waters in the Baltic Sea contain approximately 300,000 tons of conventional munitions, while the quantities in the North Sea are probably even larger with 1.3 million t. The goal of this pilot project was to make a first statement on the contamination of bottom-dwelling fish species such as dab, flounder and plaice with explosive compounds from dumped munitions in the Baltic Sea.

Material and method

Kolberger Heide, a designated munition dumpsite in the western Baltic, was chosen for investigation as well as three reference sites. More than 200 flatfish were sampled and analysed covering the species dab, plaice and flounder. The identification of the explosives was performed by HPLC-MS in bile fillet and gonads for six different explosive compounds including TNT and its metabolite 4-amino-2,6-dinitrophenol.

Key findings

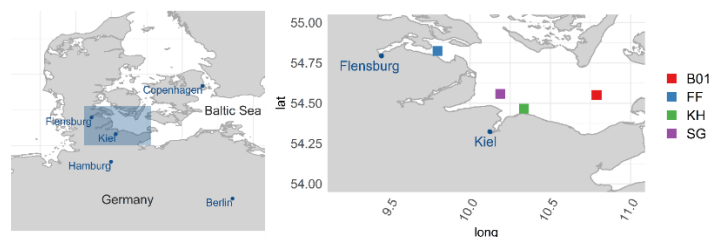
Explosives were detected in 51% of the fish bile samples from the dumping site but in only few fish from the reference sites. Dab, plaice and flounder (bile) are suitable to be included in a future monitoring strategy for explosives in the sea. None of the investigated samples of fillet or gonads were positive for explosives (< 4 ng TNT or -metabolites/g fillet). Therefore acute problems for fish consumers appear to be unlikely. However, the fish might suffer from genotoxic TNT and other explosives.

Advice for policy-makers

The results demonstrate that fish from the dumping site Kolberger Heide are exposed to a considerable amount of explosives and that the analytical methods to detect this are ready to use. The described strategy can be integrated in a future monitoring of dumped munitions in the Baltic Sea using dab, plaice and flounder bile as environmental indicators. This is closely related to the outcome of the 93rd conference of the German environment ministers in 2019 who initiate a munition screening for German marine waters.

Outlook

Adverse effects in fish exposed to leaking dumped munitions must still be expected, as the uptake and contamination of the organisms is evident.



Kolberger Heide, KH; Flensburg Firth, FF; Stoller Ground, SG; B01.

Source: Thünen Institute.

Further Information

Contact

¹ Thünen Institute of Fisheries Ecology
Ulrike.Kammann@thuenen.de
www.thuenen.de/en/fi

Short Title

DCF-Bottom-dwelling Fish

Duration

10.2019-12.2020

Project-ID

2165

Publication

Koske D, Straumer K, Goldenstein NI, Hanel R, Lang T, Kammann U, 2020. First evidence of explosives and their degradation products in dab (*Limanda limanda* L.) from a munition dumpsite in the Baltic Sea. *Mar. Pollut. Bull.* 155, 111131

Support



Supported by the European Maritime and Fisheries Fund of the European Union

DOI:10.3220/PB1613387762000