N°399 / OC
TOPIC(s) : Polymers

Ingestion of Microplastics by Pacific Oyster Larvae and effects on embryo-larval development and swimming behavior.

AUTHORS
ARNO BRINGER / UNIVERSITÉ DE LA ROCHELLE - CNRS LIENSS, 2 RUE OLYMPE DE GOUGES, LA ROCHELLE

PURPOSE OF THE ABSTRACT
Abstract ? ISGC 2019 Call for Communications
13-17 May 2019

Ingestion of Microplastics by Pacific Oyster Larvae and effects on embryo-larval development and swimming behavior.

Arno Bringer (a), Hélène Thomas-Guyon (a), Grégoire Prunier (a), Emmanuel Dubillot (a), Christelle Clérandeau (b), Jérôme Cachot (b).
(a) Littoral Environnement et Sociétés (LIENSs), UMR 7266, CNRS-Université de La Rochelle, 2 rue Olympe de Gouges, F-17042 La Rochelle Cedex 01, France.
(b) Université de.Bordeaux, Laboratoire EPOC, UMR 5805, F-33600 Pessac, France.

Plastic are persistent synthetic polymers that accumulate as waste in the marine environment. Microplastics (MPs) particles are the small particles (<5 mm) of plastic dispersed in the environment. These may be fragments of plastic objects or plastic microbeads increasingly used by industry and in cosmetics for some years, synthetic fibers or plastic waste degraded into small fragments.
To assess the impact of polyethylene microplastics (PE) on the embryo-larval physiology and behavior of the Pacific oyster (Magallana gigas) larvae were experimentally exposed to fluorescent PE (1-5µm). Fertilization success was verified under microscope, and embryos were then counted and transferred to 24-well microplates. A first batch of fertilized eggs was exposed during 24h at 24°C. A second batch of 3 days post-fertilization (3 dpf) D larvae was exposed to MPs for 1, 3 or 5h. Different concentrations of MPs were used: 0 mg.L-1, 0.1 mg.L-1, 1 mg.L-1 and 10 mg.L-1 .
After 24h of exposure of embryos, we observed a significant decrease in the size (biometric analysis) of the D larvae exposed to the different concentrations of MPs. In terms of swimming behavior, recorded maximum speed was higher for larvae exposed to MPs.
3 dpf larvae exposed for 1, 3 and 5 h to MPs were observed under ZEISS fluorescence microscope. The fluorescent nature of microplastics allowed us to observe the ingestion of these microplastics by oyster D larvae. Almost all microplastics are found in the intestine of the larvae. We observe that microplastics were ingested from 1h of exposure.
Following the same protocol as for the batch of fertilized eggs exposed during 24h, the swimming behavior (maximum speed and average speed) were recorded on 2min videos which are then analyzed with ImageJ. The swimming behavior of the 3dpf D larvae, would then be impacted more significantly following a longer exposure. At similar concentrations, larvae have a higher maximum speed when exposed longer.
In conclusion, PE microplastics were readily ingested by 3dpf D-larvae of Pacific oysters and would impact D-larvae swimming behavior and growth.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

OYSTER | MICROPLASTICS | ECOTOXICOLOGY | INGESTION

BIBLIOGRAPHY