

Long-term exposure to polybrominated diphenyl ethers (PBDEs) or polychlorinated biphenyls (PCBs) through diet affects embryonic development of common sole (*Solea solea*)

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In the field of conservation and restoration of coastal and estuarine ecosystems, there is a crucial need for a science-based understanding of how environmental conditions may influence fish performances and eventually affect the recruitment dynamic of fish populations. Persistent organic pollutants (POPs), such as PCBs (polychlorinated biphenyls) and PBDEs (polybrominated diphenyl ethers), are lipophilic and tend to bioaccumulate in cellular membranes and fat. The accumulation of lipids in oocytes during vitellogenesis, and subsequently in the eggs, favors the accumulation of POPs, and may affect the development of embryos.

In this study, common sole broodfish (*S. solea*) were experimentally exposed to POPs mixtures, *i.e.* PBDEs (five congeners) or PCBs (four congeners), added to their dietary regime during a thirty-six month period, and compared to a control group. Spawns were collected during the second annual spawning period of the broodfish, from March to the end of May 2011. The egg batches used in the study originated from broodstock replicates that spawned naturally overnight at ambient temperature. The incubators were set in a fiberglass table using a running seawater incubation system, devised for embryonic development in fishery biology studies for several fish species. Every morning, floating eggs, including the fertilized ones, were collected from either a treated or a control group counted and then randomly placed in 1L cylinder-conical incubators.

The effects of dietary exposure to POPs were evaluated on early life stages (ELS): the survival of sole embryos and features of embryonic development were assessed until hatching endpoint and compared to that of the control. No embryonic development was observed in PBDE eggs while hatching occurred in both control and PCB groups. In addition, several developmental abnormalities were observed in embryos from the PCB groups.

Our preliminary results validate the reproducibility of the experimental conditions for the incubation and handling of several batches of small marine pelagic eggs, and constitute a valuable tool for ecotoxicological studies for marine fishes. Future work will include chemical analysis of PCB and PBDE in eggs, as well as biochemical and molecular analysis in order to evaluate any possible hormonal perturbation in the common sole broodfishes.

Keywords: Common sole, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), embryos, experimental incubation

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