Long Term Impacts of Oil Spills on Bird Populations

A Spanish team of scientists has recently investigated the presence of health disorders in seagull populations exposed to the Prestige oil spill that occurred in 2002. Biological tests and the study of physiological parameters suggest the presence of non-lethal damage to the health of gulls breeding in oiled colonies. This damage appears to be caused by persistent pollutants 17 months after the incident. These findings emphasize the need to quantify the circulating level of persistent chemicals in order to assess long term impacts associated with large oil spills.

Large oil spills are likely to have dramatic effects on marine ecosystems and result in the increased exposure to toxic compounds of marine organisms and seabirds. Oil pollution affects in particular large species which have long life spans and which spend time on the water surface, such as seabirds and marine mammals. In addition, oil spills contain many pollutants that may have long term impacts on living communities. For instance, polycyclic aromatic hydrocarbons (PAH) are well-known toxic compounds contained in oil that cause damage because of their high stability (and thus long life span) in the environment. Because of their high affinity with fat tissue, PAH may affect whole food chains, species at high trophic levels being particularly exposed. Whereas the acute effects of crude oil ingestion on avian physiology have been well described, studies on the effects related to long term exposure to oil pollutants are scarce. Assessing the long term impacts of oil spills is therefore of significant importance in order to better assess their environmental impacts and to develop an adequate response.

In a recent study, Spanish researchers have conducted biochemical tests on seagull colonies breeding on shores exposed to the 2002 Prestige oil spill off Galicia. In addition, they also measured 16 PAH concentrations in the bird tissues and compared these results with other colonies not affected by the environmental disaster. The sampling was carried out 17 months after the oil spill. The main results of the study are as follows:

- Gulls sampled in oiled colonies show much higher blood concentrations of PAH than those breeding in spots without oil, and PAH levels were similar among chicks and adults. In oiled colonies, PAH concentrations were significantly correlated to blood parameters, indicative of physiological disorders.
- Biochemical tests in exposed colonies suggest damage to vital organs (the liver and kidneys) in adult birds. However, damage was smaller among chicks. As pollutant concentrations were of similar magnitude between age-groups (adults versus chicks), this suggests that the stronger effects in adults were due to longer exposure and/or severe exposure in the months following the spill.
- High PAH concentrations among chicks indicate that these pollutants were incorporated into the food chain as they were not exposed to the crude oil.

These results suggest a delayed non-lethal impact on seabirds 17 months after the spill. A clear effect of the spill on food availability was not clearly detected and the effect of the spill was mostly expressed in terms of organ dysfunctions caused by PAH exposure, the liver and kidneys being particularly affected. There is also clear evidence that the oil spill affected the food chain as proved by the high pollutant concentrations found among chicks. The authors conclude that there is a risk of underestimating the impacts of oil spills on seabirds by overlooking long term impacts resulting from chronic exposure. As some studies have revealed that long term exposure could have stronger impacts on population dynamics than direct mortality, evaluating long term non-lethal effects is imperative when quantifying the real impact of oil pollution on wildlife.

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