Histopathology in digestive gland of mussels from Galicia and Biscay Bay after the Prestige oil spill (2003-2006)

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ABSTRACT

Fish and mollusc histopathology provides a useful tool in biological effect monitoring programmes through which environmental stress situations may be diagnosed on the basis of augmented prevalence or intensity of diseases and parasitic infestations.

In the present study, the histopathological examination of the digestive gland of wild mussels was performed as a part of the biomonitoring programmes carried out to assess the biological effects of the Prestige oil spill. Ten mussels, Mytilus galloprovincialis, were collected from 22 localities along the Northern Iberian Peninsula in February (2004), April (2003, 2004, 2005, 2006), July (2003, 2004, 2005), September (2003) and October (2004, 2005). Immediately after collection, mussels were sacrificed and fixed in 4% formaldehyde containing 0.1M phosphate buffer. Once in the laboratory, tissue samples were routinely processed for paraffin embedding and sectioning. Tissue sections (7µm) were stained with haematoxylin-eosin and examined under the light microscope. Slides with coded labels were used to avoid subjectivity. Histopathological alterations, including parasites and tissue lesions, were systematically recorded. These alterations were scored for intensity using either a quantitative or semi-quantitative scale (Kim et al., 2006).

Some parasites and diseases resulted to be only of local interest. The protozoan parasite Marteilia was only recorded in Pedreña, Laredo and Hondarribia, trematode sporocysts in most Galician localities, and granulocytomas mainly in Mundaka. Other histopathological alterations such as the so called "unusual bodies", metacercariae and rickettsia/chlamydia-like organisms (R/CLO) presented a wider geographical distribution but were only found sporadically. Overall, the most frequent parasite was the protozoan Nematopsis spp (Gregarine), which is considered non-pathogenic except when the infection is extremely intense. Interestingly, high prevalence and infection intensity were recorded mainly in the Basque coast and Central Cantabrian Sea all over the study period (2003-2006) and in the Galician coast in the first two sampling years (2003-2004). The prevalence and infection intensity of the copepod Mytilicola intestinalis were also high but only in some particular localities (Aguiño and Segaño in Galicia; San Vicente, Pedreña and Laredo in Central Cantabrian Sea; and Arrigunaga, Gorliz, Mundaka and Hondarribia in the Basque coast). Likewise, intracellular ciliates, accumulation of brown cells and hemocytic infiltrations were also very abundant throughout the study area.

In general terms, the most remarkable effect determined after Prestige oil spill is an increase in infection intensity rather than prevalence. Thus, for example, a high infection intensity of Nematopsis spp, was recorded in most localities up to July 2004 and later on values were markedly reduced. These observations might indicate some transitory weakening of the immune defence system in wild mussels but definitive conclusions can not be substantiated since historical records are lacking. Nevertheless, the present histopathological data will be integrated with biomarkers and other parameters, which in combination with chemical analyses could give some light to determine the extent of the biological effects of the Prestige oil spill.

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