sampling year, populations were plotted according to their estuarine position, following the downstream decreasing metal concentration gradients. Although most metals followed this pattern, the effect was largely determined by the soft tissue Cd, Zn and Mn concentrations. Compared to 1998, each sampling site was strongly shifted towards increasing soft tissue metal levels in 2000 and 2002. Metal input levels can not explain the current observations in *L. littorea*, since they decreased significantly over time in the Scheldt estuary. In contrast, upstream shifts in both dissolved oxygen and nutrient load may be invoked to explain the soft tissue metal increase in *L. littorea*, as they may have remobilised metals from the anoxic sediment phase making them available for uptake.

TUP-08/10

HEAVY METAL CONTAMINATION IN A *MUGIL* WILD POPULATION OF A COASTAL LAGOON

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Polluted sediments usually contain complex chemical mixtures that may have synergistic and/or antagonistic effects on target organisms. Establishing causality in the field, is thus, particularly difficult and the biomarker responses recorded in whole sediment toxicity assays are o correlative nature only.

Biomarker levels reflect not only the class but also the magnitude of acute xenobiotic exposure. However, there is limited information regarding responses to chronic exposures.

The measurement of blood serum chemistry parameters is a further commonly used diagnostic tool in fish toxicology and biomonitoring.

The Esmoriz/Paramos coastal lagoon, located in the Northwest coast of Portugal, receives untreated industrial and domestic effluents that pose under threat this habitat. *Mugil salens* is found in the lagoon and was investigated for evidence of pollution impacts.

The aim of this work is the investigation of heavy metal contamination in the lagoon sediments, the analysis of metal bioaccumulation in fish liver and the assessment of plasma enzyme levels in the fish population.

The metal concentrations in the lagoon sediments and fish livers were inversely related. High concentrations of zinc and lower concentrations of copper were found in the sediments whereas in the fish livers copper was significantly higher than zinc. This result may be explained by the loss of the homeostatic control mechanisms for copper.

The length, age, total weight, and liver weight was determined for 35 fishes collected from the lagoon and some correlations with metal content in the liver were obtained. Copper content in fish livers showed a dependency upon age, suggesting that bioaccumulation is primarily a function of exposure time. There was also a significant negative correlation between liver weight and liver metal content. The measured alanine aminotransferase, commonly associated with liver damage, was found to decrease with the age of the fish.

TUP-08/11

DISTRIBUTION OF SELENIUM IN THE TISSUES OF COASTAL BRAZILLIAN FISH AND A MUSSEL

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Selenium (T-Se) was determinated in the muscle and liver of three fish species with different feeding habits, a planktivorous (N=31), an omnivorous (N=14) and a carnivorous (N=34), and in the soft tissues of a common mussel (N=40) from one of the most important estuaries for fish production on the south-eastern Brazilian coast, Guanabara Bay. The median of T-Se in fish muscle was higher in carnivorous (0.29 mg.Kg-1) than in planktivorous (0.11 mg.Kg-1) and omnivorous (0.07 mg.Kg-1). The liver of all fish species presented higher T-Se than that found in their muscle. The liver of the carnivorous and planktivorous fishes presented similar T-Se (2.47 mg.Kg-1 and 2.44 mg.Kg-1 respectively), which were higher than that found in the same tissue of the omnivorous fish (1.30 mg.Kg-1). The only tissue that presented a direct influence of the feeding habits was the muscle. Significant relationship between T-Se in the muscle and the fish total length was observed for carnivorous (R = 0,84; p<1x10-4) and planktivorous (R = 0,64; p = 1x10-4) fishes. The median of T-Se in the soft tissue of the mussel was 0.16 □g.g-1 w.w. Mussel presented a significant correlation (R = 0,91; p = 5x10-4) between T-Se in the soft tissues and their condition index (IC). IC is the ratio between the mass of soft tissues and the shell lenght. There was a highly significant difference (H=5,96; p=0,05) between T-Se in the soft tissues of the mussel and the different sampling points at the bay. The observed concentrations of T-Se in the tissues of all studied species from this impacted ecosystem with organic matter, oil and heavy metals were similar to that found in the literature for nom-impacted environment.

TUP-08/12

BIOMONITORING OF ORGANOCHLORINE PESTICIDES, PAH AND HEAVY METALS AND ITS EFFECTS IN EELS (*ANGUILLA ANGUILLA*) FROM THE CAMARGUE BIOSPHERE RESERVE

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Pesticides, polycyclic aromatic hydrocarbons (PAH's) and heavy metals are toxic to fish and may be taken in through gills, skin and contaminated foods. Here we measure concentrations of organochlorines (OCs), PAH's and heavy metals, and their effects in the eel Anguilla anguilla from three locations in the Camargue Reserve in southern France. The Camargue Biosphere Reserve is the largest coastal wetland in Western Europe, where A. anguilla is a common predator at the top of the food chain. Livers and spleens were analyzed for histopathological, chemical and organo-somatic (HSI and SSI) effects. Gills, livers and spleen samples were collected for histopathological studies. Livers and muscles were sampled for metabolic parameters and POPs analysis. Total lipids were estimated by spectrophotometry and lipid-free residues were used in protein and glycogen analysis. OC pesticides were extracted from lipids of muscles and livers, analyzed by gas chromatography, and PAH's from bile were analyzed by fixed wave length fluorescence spectrofluorimetry. Heavy metals were measured by Inductively Coupled Plasma with Optical or Mass Spectrometers. High concentrations of contaminants were found in the eels. Greatest OC and PAH's concentrations were measured at 'La Capeliere' Site; unexpected lesions in gills, livers and spleens were more common at the other sites. Liver and spleen tumors and lipidosis in livers were associated with chronic, and gill lesions with acute, exposure. High pesticide and PAH's concentrations and lesions in eels from the Camargue reserve demonstrate its contamination. A more complete study in the Camargue reserve is necessary to better understand the impact on wildlife and humans. Also, this study suggests that eel biology must be better understood before continued use of this species as a biomonitor of polluted areas.

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