Assessment of *Mytilus galloprovincialis* to monitor 19 trace elements in the Calvi Bay


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**Introduction**

Mussel caging with *Mytilus galloprovincialis* has been used for a long time to monitor classic trace elements (TEs: Cd, Cu, Zn, Cr, Fe, Ni, Pb) pollution of Mediterranean coastal waters at large (10-100km) spatial scales (1). However, its relevance as bioindicator at the scale of a bay (100m-1km) is poorly known. Moreover, levels of little studied TEs (Al, V, Mn, Sb, Sn, Ag, Mo, Se, As, Co, Be, Bi), identified as potential pollutants of coastal environments (2), have not yet been assessed in that species.

**Material and methods**

Mussels from the Diane pond aquaculture farm (E Corsica) were used to monitor the 19 listed TEs at the scale of the Calvi Bay (NW Corsica; fig.1). Duplicated cages (fig.2) were immersed (March to June 2010) in 4 sites differently exposed to moderate anthropogenic influences: the Calvi sewer, an aquaculture farm, the Oceanographic Station STARESO, and a control site outside of the Bay (Punta Bianca). Decontamination kinetics (February to June 2011) and tissue speciation before (February 2011) and after (March 2010) spawning were also investigated. Bioavailable dissolved TEs were monitored with DGTs (Diffusive Gradient in Thin-films; chelex-type resins). TE concentrations were measured by DRC-ICP-MS.

**Results and discussion**

- *M. galloprovincialis* efficiently bioconcentrates the 19 studied TEs (graphs 1-3).
- TE levels measured at the scale of the Calvi Bay present little spatial variations between sites, and demonstrate the overall good water quality of the Bay (graph 2).
- Decontamination kinetics show that mussels rapidly equilibrate with their environment, and thus can be considered as a good indicator of chronic and stable pollutions (graph 3).
- Gills preferentially accumulate Mo, Se, Cd and Zn (graph 1a), and the hepatopancreas the 15 others chemicals (graph 1b).
- Mussel spawning concentrates TEs in all soft tissues (graphs 1a-b, 3).

**Conclusion**

As a filter feeder, mussels are mainly influenced by their homogeneous pelagic environment, as opposed to benthic organisms relying upon patchy food sources (3). This might explain the little spatial variations observed at the scale of the Calvi Bay. Mussels accumulate the 12 little studied TEs, and thus is a convincing candidate for their monitoring. However, the concentration effect induced by their reproductive cycle requires using this bioindicator during its sexual dormancy.