

WILL EATING FISH CAUGHT FROM THE TIBER RIVER IN ROME CAUSE ADVERSE HEALTH EFFECTS?

Silvia Ciardullo, Patrizia De Sanctis, Mauro Di Pasquale, Francesca Iosi, Emilio Guandalini, Andrea Raggi, Francesco Cubadda, Ettore Coni



6th-7th November, Cyprus

International Workshop "Foods to Dye for – Contaminants-sampling, analysis, legal limits"



Tiber River watershed: a highly populated area with 4.5 million residents

The river is severely affected by:

- **municipal effluents in the urban area of Rome;**
- **atmospheric emissions (e.g. vehicle and domestic heating exhaust gas);**
- **confluence of the heavily polluted tributary Aniene River**

Recent reports talk about some communities of immigrants that live near the banks of the river and catch fish for eating it

Therefore:



Study on behalf of the Town Council to evaluate possible health risks related to fishing for human consumption



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Several microbiological and chemical parameters were taken into account

Here the results of the survey on two classes of chemical contaminants are presented

- **Polycyclic aromatic hydrocarbons (PAHs):**
Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, Fluorene, Acenaphthene, Anthracene, Fluoranthene, Phenanthrene, Chrysene, Pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)anthracene, Benzo(a)pyrene, Dibenzo(a,h)anthracene, Benzo(g,h,i)perylene, Indeno[1,2,3-cd]pyrene
- **Trace elements:**
As, Cd, Cr, Hg, Pb



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Four edible teleost species, representative of different ecological niches and feeding habits selected to get an insight into the chemical contamination of the different environmental compartments within the river ecosystem:

- **Carp (*Cyprinus carpio* L., *Cyprinidae*)**
- **Chub (*Leuciscus cephalus* L., *Cyprinidae*)**
- **Common mullet (*Mugil cephalus* L., *Mugilidae*)**
- **Eel (*Anguilla anguilla* L., *Anguillidae*)**

Sampling was designed to verify the interspecific, spatial and seasonal variability of the contaminants in fish muscle

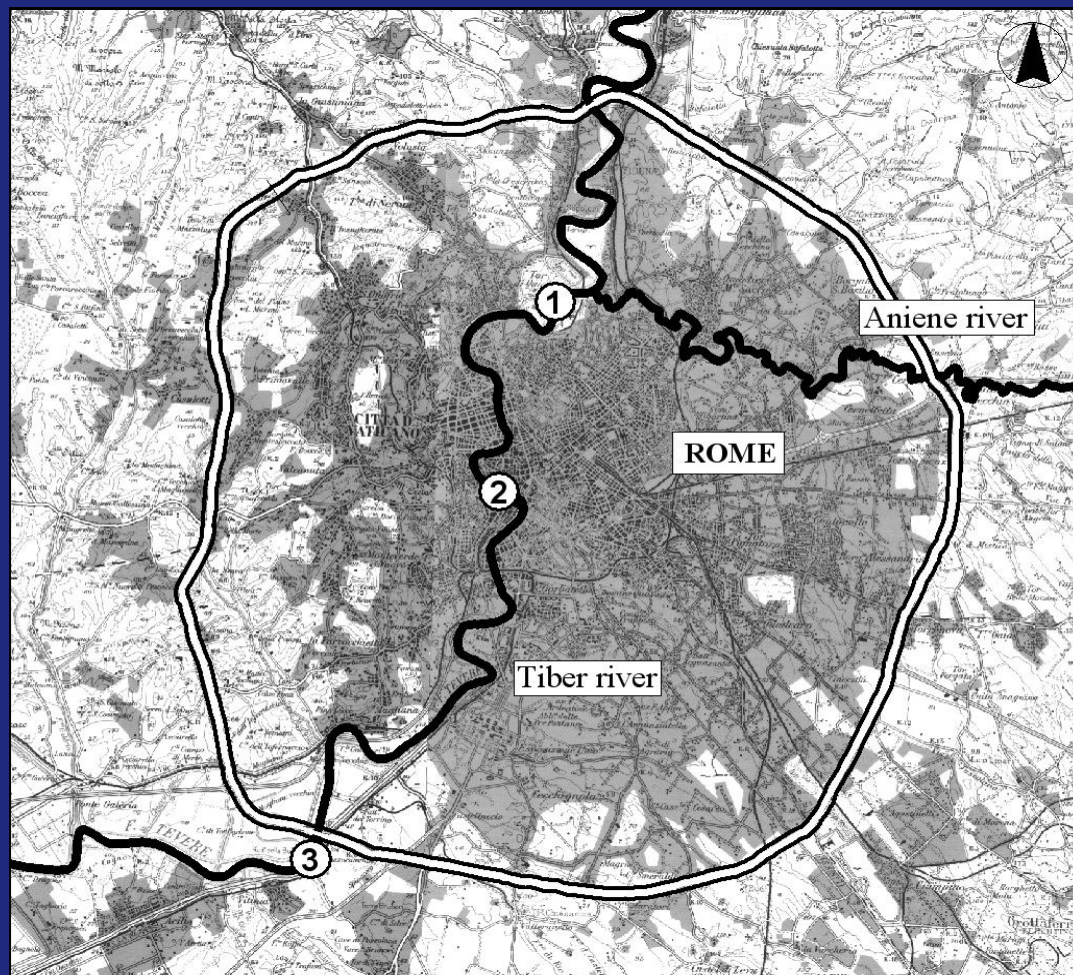


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Map of the sampling sites in the Rome urban stretch of the Tiber River



Site 1: Ponte Milvio

Site 2: Trastevere

Site 3: Magliana

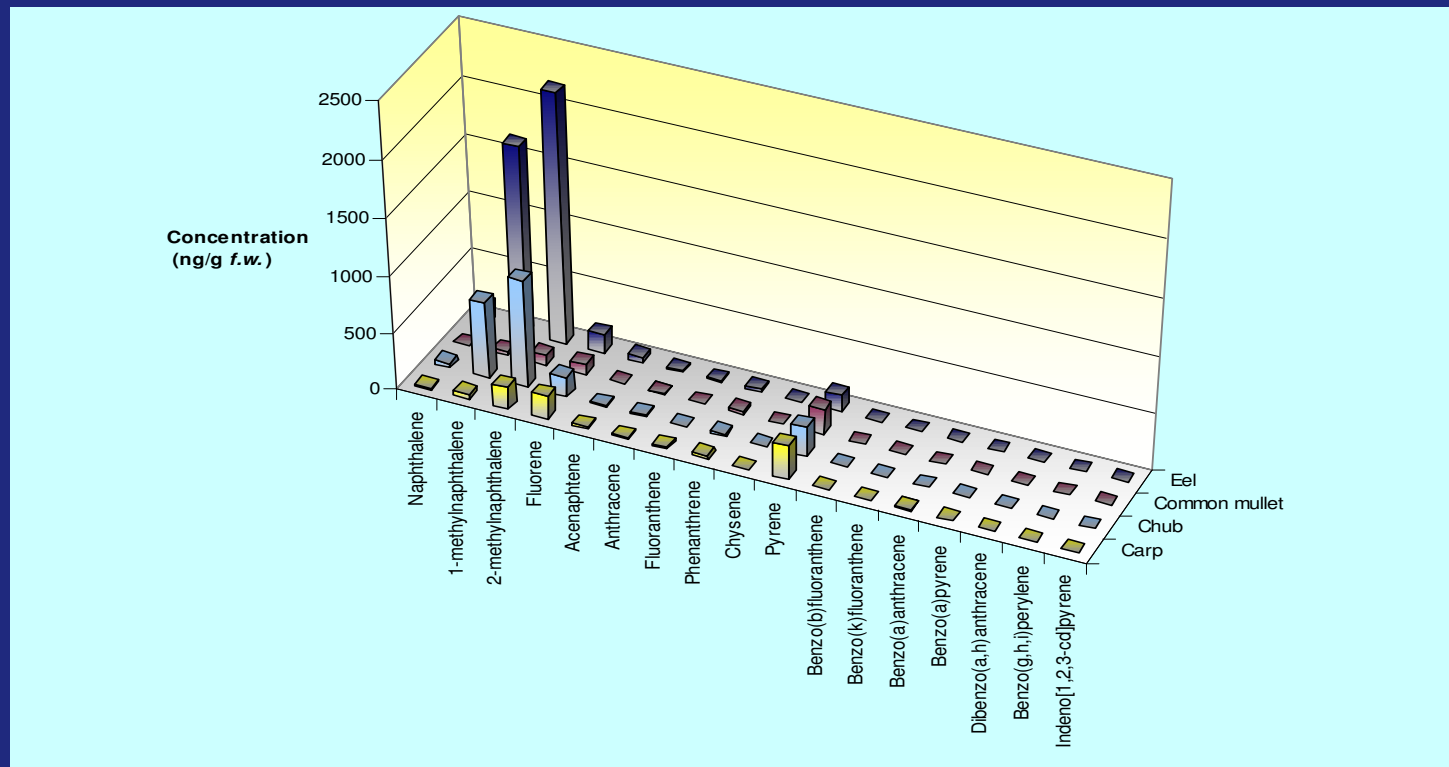


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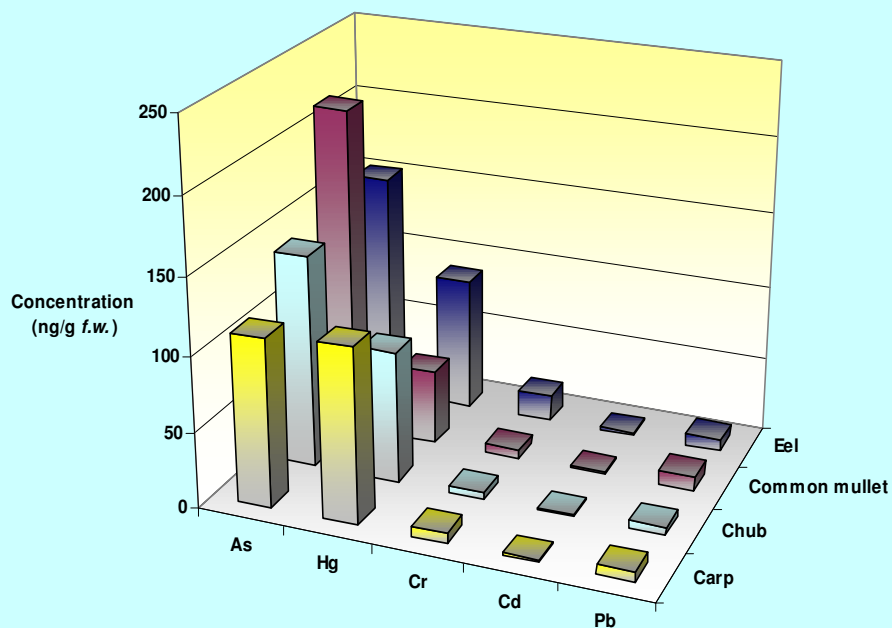


Concentrations of PAHs in fish species obtained by means of HPLC-FL. Data expressed in ng g⁻¹ as mean value (n=7).



- ✓ Levels of heavy PAHs are below the detection limits of the analytical method;
 - ✓ Levels of light PAHs are rather low if compared with those ascertained for the same species in previous surveys in other European rivers.
- ➔ Exception: 1-methylnaphthalene, 2-methylnaphthalene (catalytic converters)
fluorene, pyrene (domestic heating)

Concentrations of trace elements in fish species obtained by means of ICP- MS (As, Cd, Pb), DRC-ICP-MS (Cr) and FI-CV-AAS (Hg).



✓ Concentrations of As and Hg are generally similar to (and often lower than) the values found for the same species in other studies dealing with freshwater environments;

✓ Cd, Pb and Cr are found at remarkably lower concentrations with respect to literature values.

Data expressed in ng g^{-1} as mean value ($n=5$).

Conclusions

Various environmental factors:

- ✓ high pH
- ✓ high water hardness
- ✓ high suspended matter

are probably responsible for the observed low contamination of the aquatic resources in the study area

However:

the use of clean room conditions and strict QA/QC procedures when performing determination of trace contaminants shall be emphasized



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