Striped Venus (*Chamelea gallina*) in Neretva Estuary - Biological Evaluation and Estimation of Petroleum and Chlorinated Hydrocarbons

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Edible shellfish Striped venus (*Chamelea gallina)* in great abundance inhabits the alluvial sands along the Italian (Adriatic) coast and makes an extensive fishable resource over which today about 700 fishing vessels (hydraulic dredges) FROGLIA (1989) produce yearly about 100.000 tons.

Thanks to the fisheries experience gained along the Italian coast it is for the first time in the estuary of Neretva river discovered fairly abundant bank (0.5 km²) of Striped venus population of the (Fig. 1) standing stock size and annual yield of 100 tons for only two fishing boats.

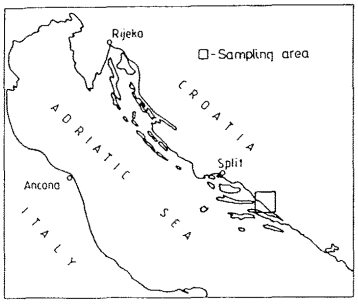

Fig. 1. Area of investigation - Neretva estuary

Since the habitat of this benthic community is exposed to the Neretva river various organic discharges, either directly by river inflow or by agriculture activities, a sanitary control and evaluation of organic pollutants concentration accumulated in species tissue for marketing purposes has been performed.

Idioecological characteristics of the species in the western Adriatic are described by POGGIANI *et al.*, (1973) while the biometric, i.e. length frequency distribution of the species in the Neretva river estuary is presented on the Fig. 2.

The presence of chlorinated hydrocarbons was also established in the shellfish tissue (hexachlorobenzene, heptachlor, aldrin, DDT and its metabolites and lindan. Found values range from 1.4 ng/g of tissue dry weight for lindan to 10.0 ng/g for ppDDT. (Fig. 3). For some compounds these values exceed the limits permitted by the Book of regulations for foodstuffs. The values recorded for DDD were exceptionally high (1050 ng/g). Policyclic aromatic hydrocarbons are the second type of found organic pollutants. Their proportion makes up 2.2 µg chrysene equivalents per g of dry weight that is 26.1µg ROPME oil per gram of dry weight. The characteristic emission spectra of I and II aromatic fractions is presented in Fig. 4, where the benzopyrene peak is evident as well as the aromatic compounds with 2-4 rings (oil source).

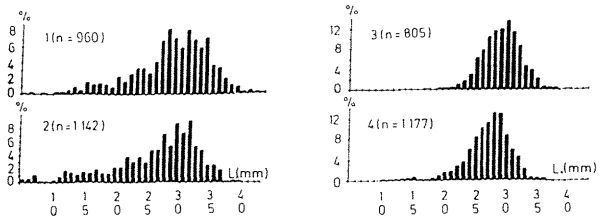

Fig. 2. Length frequency distribution of the Striped venus in the Neretva estuary (December 1990)

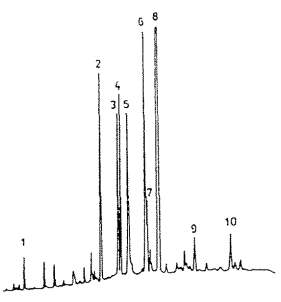

Fig. 3. EC capillary chromatogram of the F_2 fraction of shellfish in the Neretva estuary (December 1990). Numbered peaks belongs to following compounds: 1-lindane; 8-DDD; 9-DDT; 2-7 and 10-unknown

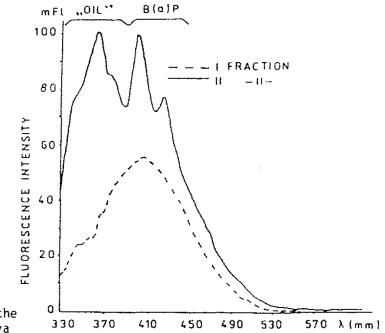

Fig. 4. Continuos emission spectra of the first (I) and second (II) fraction of shellfish in the Neretva estuary (December 1990)

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Chlorinated hydrocarbons in a Mediterranean monk seal (*Monachus monachus*)

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Marine mammals form ideal repositories for chlorinated hydrocarbons because they are long-lived, having a relatively long exposure time and their lipid depot reserves are very extensive in proportion to their size (GUSKIN, 1982). The fact that they occupy high trophic levels in marine ecosystems results to high chlorinated hydrocarbon concentrations in their flesh and organs (REIJNDERS, 1990).

This study reports on the PCBs, DDTs and HCHs concentrations in several tissues of a mediterranean monk seal, washed out dead at Santorini Island in March 1990. The specimen was an adult male (VI+ years old) having a curvilinear length of 218 cm and a total length of 239 cm (SCHEFFER, 1967). Samples were taken from the muscle, the blubber, the kidney, the liver, the spleen, the heart, the brain and the lung. Each sample was wrapped in aluminum foil and preserved in deep freeze. GC analysis was performed according to SATSMADJIS *et al.*, (1988) on a GC (Varian 3700) equiped with a 63 Ni electron capture detector and a fused silica Megabore column DB-1 30 m long.

Higher PCBs and DDTs values coincided with the blubber (Table 1), observation being in good agreement with the positive relation existing between chlorinated hydrocarbons and lipids in marine organisms (STOUT, 1980). The most contaminated organs were the liver and the spleen. The brain, although having a high amount of lipids, displayed relatively low chlorinated hydrocarbon concentrations. This is mainly attributed to the fact that most of its lipidic compounds are either phospholipids or total cholesterol (KALOGEROPOULOS, pers. com.). Among DDTs, p,p'-DDE exhibited higher values (Fig. 1), due to its higher persistence in relation to the other DDT metabolites (OLSSON 1977).

Table 1. Concentration of PCBs, DDTs, HCHs (ppb on a wet weigt basis) and lipids (%) in various tissues of the mediterranean monk seal collected at Santorini Island in 1990.

	Lipids	PCBs	DDTs	HCHs
Blubber	86.9	15223.3	17163.8	26.7
Muscle	0.7	109.5	174.7	0.9
Kidney	1.5	111.2	166.8	1.0
Liver	2.4	539.9	529.1	1.2
Spleen	2.6	349.5	503.7	1.1
Heart	1.0	47.1	103.7	0.4
Brain	10.8	159.9	160.5	2.2
Lung	0.8	48.0	59.6	0.8

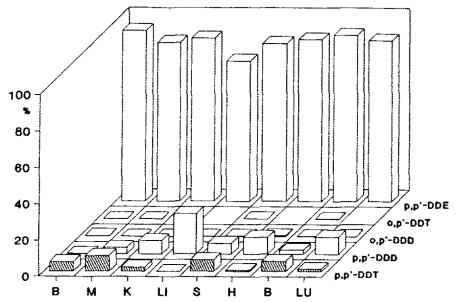

Fig. 1 : Proportion (%) of the DDT metabolites in the various tissues of the mediterranean monk seal. (B=Blubber, M=Muscle, X=Kidney, LI=Liver, S=Spleen, H=Heart, B=Brain, LU=Lung)

Further studies are required in order to collect data on chlorinated hydrocarbon concentrations in mediterranean monk seal, a species endangered with extinction, since these, pollutants affect its ability to resist various diseases and cause failure to reproductive activity (HELLE *et al.*, 1976a & b).

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