



Approaches for assessing potential impact of thyroid hormone disrupting chemicals in wild seabass (*Dicentrarchus labrax*)



Joseph G. Schnitzler^{1§}, Peter H. M. Klaren², Jean-Pierre Thomé³, Krishna Das¹.

¹ Univ Liege B6C, Lab Oceanol, MARE Ctr, B-4000 Liege, Belgium

² Radboud Univ Nijmegen, Fac Sci, Dept Anim Physiol, NL-6525 ED Nijmegen, The Netherlands

³ Univ Liege, Lab Ecol Anim & Ecotoxicol, B-4000 Liege, Belgium

§ Corresponding author: joseph.schnitzler@ulg.ac.be

INTRODUCTION

Organic compounds such as pesticides and polychlorobiphenyls (PCBs) are well described endocrine disrupters; of particular interest are effects on thyroid function. To assess the ability of occurring pollutants in European coastal areas to disrupt the thyroid system in European sea bass (*Dicentrarchus labrax*) (Fig. 1), a field study in the major European estuaries, namely, the Scheldt, the Seine, the Loire, the Charente and the Garonne has been conducted.

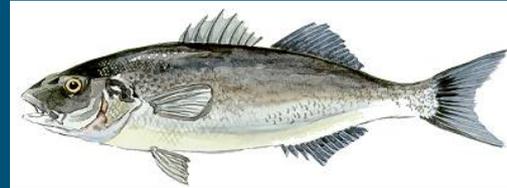


Fig. 1: European Sea Bass (*Dicentrarchus labrax*)

MATERIALS AND METHODS

Several thyroid endpoints were simultaneously examined. Diameter of follicles and the epithelial cell heights give an indication on the production and secretion activity of the thyroid gland. The activity of enzymes involved in the metabolism (deiodination, glucuronidation and sulfatation) of thyroid hormones were analyzed.

Finally thyroxine (T4) and triiodothyronine (T3) concentrations were analyzed in muscle by radioimmunoassay. The combined use of all those endpoints gives us an overview of the complex thyroid hormone system.

RESULTS AND DISCUSSION

- ✓ The contamination levels were as follows, the highest concentrations were measured in individuals collected from the coastal region near the Scheldt > Seine > Loire > Charente and the lowest levels were observed in sea bass from coastal regions near the Garonne (Fig. 2).
- ✓ The measured levels were generally higher than those reported in literature in sea bass from other regions (Fig. 2).

- ✓ No clear relationship between OC levels and changes in thyroid histological appearance could be observed.
- ✓ Measurements of metabolic activity revealed an modified hepatic T4 outer ring deiodinase and T4 sulfatation activity whereas T4 glucuronidation was not affected (Fig. 4).

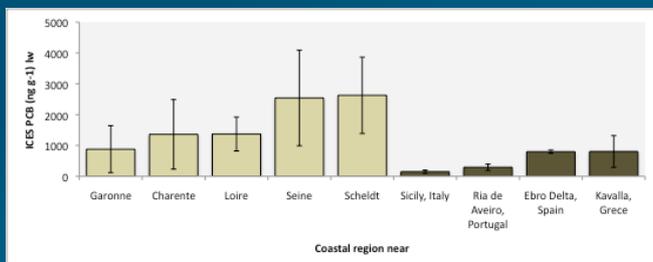


Fig. 2: Organochlorine pollutant contamination levels in muscles of European sea bass specimens (ng g⁻¹ lipid) Data from this study is shown in light brown. Sicily , Italy = (Lo Turco, 2007); Ria de Aveiro, Portugal = (Antunes et al., 2004); Ebro delta, Spain = (Pastor et al., 1996) and Kavalla, Greece = (Schnitzler et al., 2008)

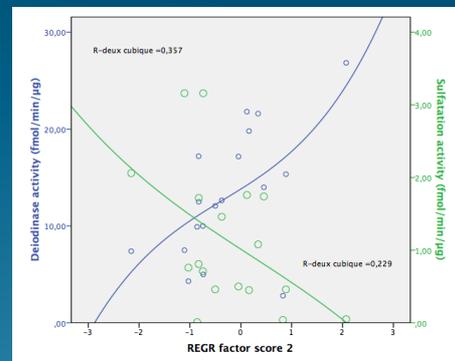


Fig. 4: Mean deiodination and sulfatation activity in sea bass liver

- ✓ Contamination patterns were different depending on the sampling area and thus the river input of pollutants (Fig. 3).

- ✓ Owing to the extensive autoregulatory feedback at both central and peripheral levels, the thyroid hormone concentrations were preserved thanks the PCB induced changes in thyroid hormone dynamics (Fig. 5).

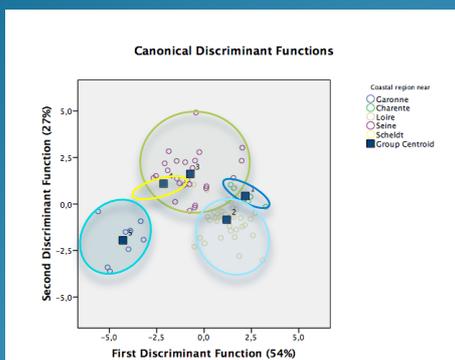


Fig. 3: Plot of the results of discriminant analysis for intersite comparison of contamination patterns on the basis of lipid weight normalized organochlorine compound concentrations

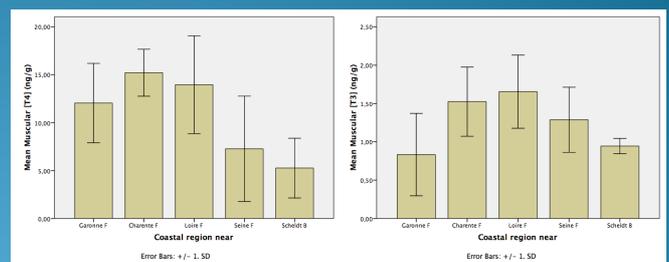


Fig. 5: Mean muscular thyroid hormone concentrations (T4 and T3)

- ✓ Please come and see the presentation of the experimental part of this study **today at 15h20 in Sala Albaicin 2!**