

ALTERATIONS IN TESTICULAR STRUCTURE OF MALE GRASS GOBY (*ZOSTERISSESSOR OPHIOCEPHALUS*) IN BIZERTA LAGOON, TUNISIA.

Ibtissem Louiz ¹, Mossadok Ben Attia ² and Oum Kalthoum Ben Hassine ^{1*}

¹ Unité de Recherche de Biologie intégrative et Écologie évolutive et fonctionnelle des Milieux Aquatiques, Faculté des Sciences de Tunis, Université Tunis-El-Manar, 2092 El Manar, Tunisie - kalthoum.benhassine@gmail.com

² Laboratoire de Biosurveillance de l'Environnement, Faculté des Sciences de Bizerte, Université de Carthage, 7021 Zarzouna, Tunisie

Abstract

Testicular histology of mature grass goby (*Zosterisessor ophiocephalus*) collected in Bizerta lagoon showed several types of histological lesions. A high prevalence of these lesions was detected in stations influenced by discharges of industrial and/or urban activities. These results highlight the reproductive disturbance of gobies from Bizerta lagoon.

Keywords: Pathology, Reproduction, Pollution, Fishes, Tunisian Plateau

Introduction: Bizerta lagoon, a site of important halieutic and aquaculture activities, is located in an economically important area in northern Tunisia. This lagoon is faced to many anthropogenic pressures including urbanisation, industrial and agricultural activities. Thus, wastewater discharges lead to the chemical contamination of the lagoon by various toxic compounds. As a possible consequence of this state of disturbance, annual fish productivity of this lagoon records a drop which is accentuated from a year to another. Therefore we chose to study the prospective impact of this pollution on male Grass goby reproduction using a histopathological approach.

Materiel and methods: Five sampling stations, representative of the different anthropic pressures present in the study area, were chosen (NJ: Njila, MB: Menzel Bourguiba, MR: Maghrawa, MJ: Menzel Jemil et ML: Menzel Abderrahmen). A relatively undisturbed site [1] located at the seawards entrance of Ghar el Melh lagoon (GH) was selected as a reference station. A total of 25 adult males gobies were collected in breeding period that extending from March to Mai. These specimens were immediately processed for gonad histology.

Results and discussion: Histological sections of gonads revealed many types of histological lesion associated with degenerative changes.

nuclei « SeCH »; (c) vacuolated germ cells (d) increased gaps in the interstitium between lobules « IG ». (H&E stained). Bar indicates 10 µm.

Histopathological alterations diagnosed in the testis of male from MB site were important and included germ cell syncytia (100 %) (Fig. 1a) associated with a high prevalence of Sertoli cell nuclei hypertrophy (67 %) (Fig. 1b) as well as misshapen seminiferous tubules. In ML and MJ stations, we noticed that testis exhibited increased gaps in the interstitium between lobules (IG) with huge span filled with connective tissue (13% and 10%, respectively) (Fig. 1d, Tab. 1). These testes have as well vacuoles in the interstitial tissue (Fig. 1c) and melanomacrophage centers (MMC) (Tab. 1). Predominance of histopathological lesions present higher values in MB station (Table 1), situated near of an industrial zone and exhibiting a high contamination by organotins [2], polycyclic aromatic hydrocarbons (PAHs) [1] and estrogen-like compounds [1] that can cause endocrine disruption in fish [3, 4].

Tab. 1. Testis histological lesions finding and associated prevalence and severities. N: sample size; P%: prevalence of histological lesions; S%: percentage of the gaps surface areas.

Sites	N	CSyn P%	SeCH P%	CSyn cell /view	CMM P%	IG S%
GH	4	0	0	0	0	4
NJ	3	0	0	0	0	5
MB	3	100	67	5.5	33	4
MR	2	0	0	0	0	4
MJ	3	50	0	2.3	50	10
ML	10	30	60	0.2	40	13*

Conclusion: The present work confirms that *Z. ophiocephalus* has been subjected to reproduction disturbances and showed histopathological lesions related with pollutants exposure.

References

- 1 - Louiz I., Kinani S., Gouze M.-E., Ben-Attia M., Menif D., Bouchonnet S., Porcher J.-M., Ben-Hassine O.K. and Aït-Aïssa S., 2008. Monitoring of dioxin-like, estrogenic and anti-androgenic activities in sediments of the Bizerta lagoon (Tunisia) by means of in vitro cell-based bioassays: contribution of low concentrations of polynuclear aromatic hydrocarbons (PAHs). *Sci. Total Environ.* 402, 318–329.
- 2 - Mzoughi N., Lespes G., Bravo T.M., Dachraoui M. and Potin-Gautier M., 2005. Organotin speciation in Bizerte lagoon (Tunisia). *Sci. Total Environ.* 349, 211–222.
- 3 - Chen Y., Zuo Z., Chen S., Yan F., Chen Y., Yang Z. and Wang C., 2008. Reduction of spermatogenesis in mice after tributyltin administration. *Toxicology*, 251 (1-3): 21-27.
- 4 - Miles-Richardson S.R., Kramer V.J., Fitzgerald S.D., Render J.A., Yamini B., Barbee S.J., and Giesy J.P., 1999. Effects of waterborne exposure of 17 β-estradiol on secondary sex characteristics and gonads of fathead minnows (*Pimephales promelas*). *Aquat. Toxicol.* 47: 129-145.

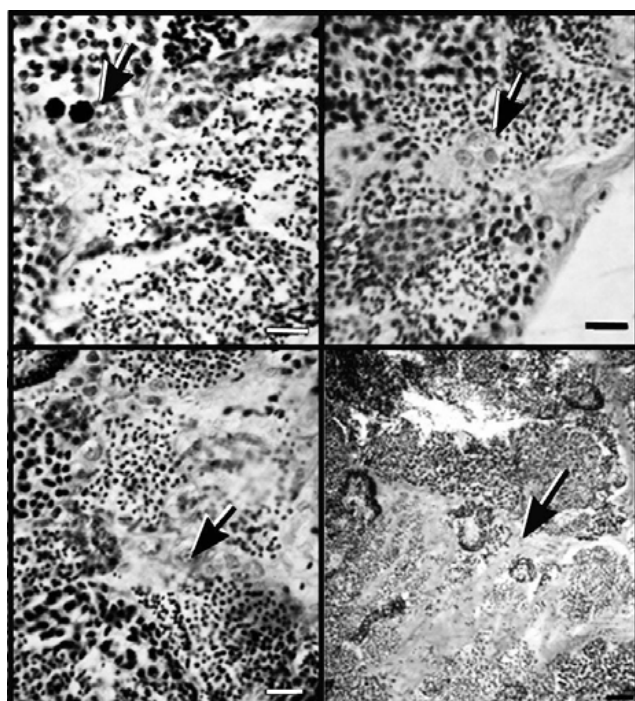


Fig. 1. Testis histological section showing some examples of degenerative findings include: (a) syncytic cells « CSyn »; (b) hypertrophied Sertoli cells