EFFECTS OF ANDROGENIC AND ANTI-ANDROGENIC SUBSTANCES ON THE FRESHWATER GASTROPOD *LYMNAEA STAGNALIS*

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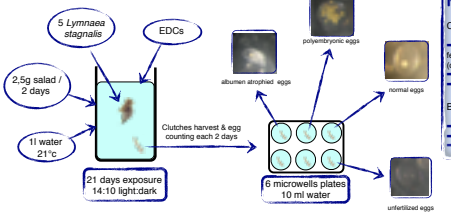
Introduction

Knowledge on the impacts of endocrine disrupting chemicals (EDCs) on gastropods is scarce and their mechanisms of action are still poorly understood.
In this study, effects of 3 androgens (tributyltin, testosterone and fenitrothion), 2 anti-androgens (cyproterone acetate and vinclozolin) and 1 estrogen (chlordecone) on growth and reproduction were investigated in the hermaphrodite gastropod *Lymnaea stagnalis*.



Material & Methods

Contamination

- **androgenic** and **anti-androgenic chemicals** (tributyltin, testosterone, fenitrothion,vinclozolin, cyproterone acetate) and **estrogenic** chemical (chlordecone)
- 3 environmental concentrations
- 6 replicates per treatment

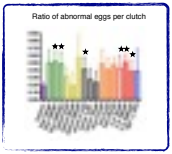
Biological endpoints

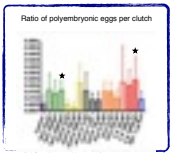
- Adult fecundity (i.e. number of clutches, eggs per clutch)
- Proportion of abnormal eggs (i.e. polyembryonic, without albumen)
- Hatching rate after 28 days in clean water

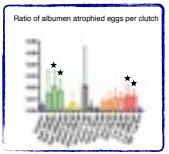

Lymnaea stagnalis

Results & Discussion

Lymnaea stagnalis exposed to tributyltin (TBT) at 10 and 100 µg Sn L^{-1} all died after 14 and 3 days of exposure respectively. Fecundity was significantly reduced at the lowest concentration (1 µg Sn L^{-1}). Therefore **TBT** endocrine effects might occur at lower concentration than those tested.







- EDCs induced a decrease in fecundity and egg quality.
- **Testosterone** (10-100-1000 ng L^{-1}) and **cyproterone acetate** (10-100-1000 µg L^{-1}) led to an increase in **abnormal eggs** proportion, especially in **albumen atrophied** and **polyembryonic eggs**.
- **Vinclozolin** at 100 ng L^{-1} induced similar effects to those obtained with testosterone and cyproterone acetate, while the 2 highest concentrations (1-10 µg L^{-1}) had less impact on the fecundity and egg quality.
- These results suggest an impact of EDCs on the **albumen gland** of the gastropod.
- **Fenitrothion** and **chlordecone** had no significant impact on the egg quality nor on the fecundity.

Conclusions

- Some EDCs induce impairment of fecundity and eggs quality on *L. stagnalis* at **environmental** concentrations
- Our results suggest an impact of androgens and anti-androgens on the **albumen gland** of the gastropod
- Those results should be confirmed in further studies with more concentrations of EDCs
- The mechanisms of action will be investigated by proteomic analysis in the contaminated snail
- Histological observations will provide insight on the impact of EDCs on gonads of exposed *Lymnaea stagnalis*

Acknowledgements

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