



Persistence of atrazine impact on aneuploidy in the Pacific oyster, *Crassostrea gigas*

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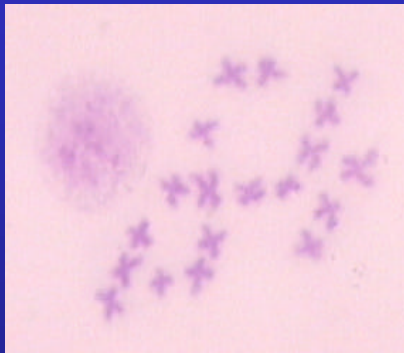
Aneuploidy, definition & origin

- Gain (hyperdiploidy) or loss (hypodiploidy) of homologous chromosomes in a chromosomal pair
- Non-disjunction of chromosomes during mitosis or meiosis (Bond & Chandley, 1983; Martin & Rademaker, 1990)
- Common in bivalve populations and especially in *Crassostrea gigas* (Thiriot-Quévieux, 1986)

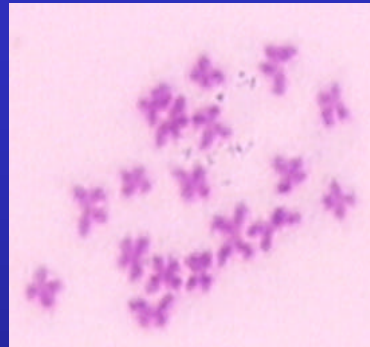


Aneuploidy in *Crassostrea gigas*

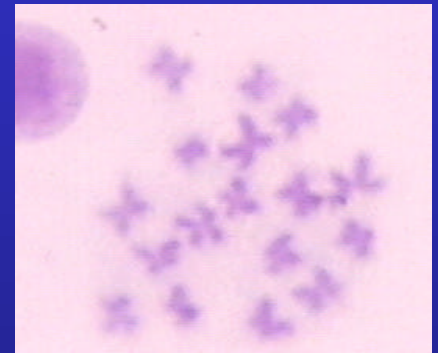
- Alteration of the normal diploid chromosome number ($2n=20$) in hypodiploid cells with $2n=19$, 18 or 17 (Thiriot-Quévieux *et al.*, 1992)



$2n=19$



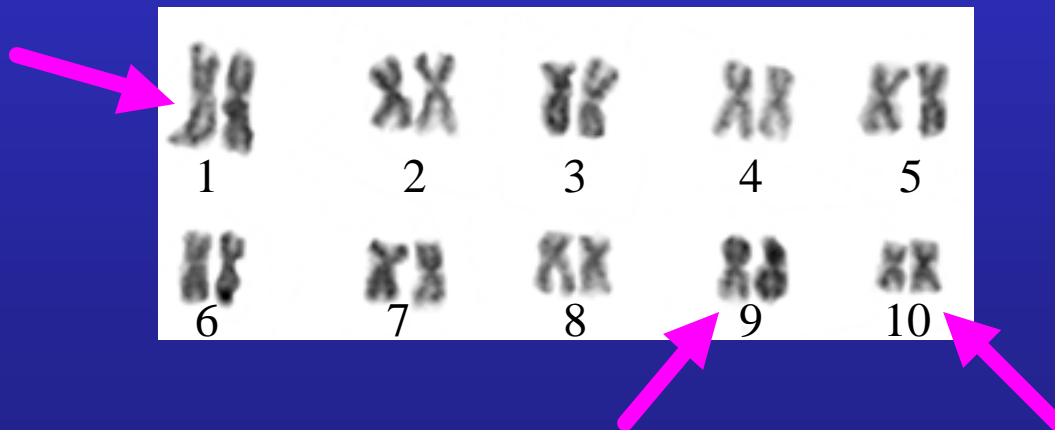
$2n=18$



$2n=17$

Understanding the phenomenon

- Negative correlation between somatic aneuploidy and growth rate (Leitão *et al.*, 2001a)
- Genetic basis for the control of aneuploidy level (Leitão *et al.*, 2001b)
- Differential chromosomal susceptibility (Leitão *et al.*, 2001c)



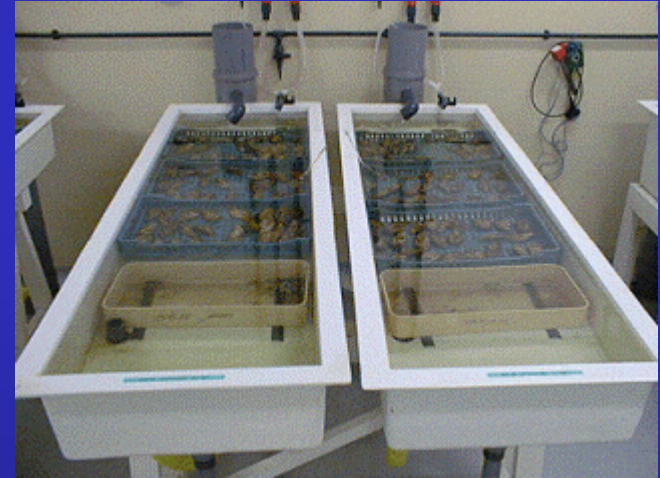
Effect of environmental factors (pollutants) on aneuploidy?

- Atrazine:
 - herbicide widely used for maize culture
 - transport to the aquatic environment by leaching and erosion of soil
 - carcinogenic molecule, may induce lethal or sub-lethal effects in aquatic organisms



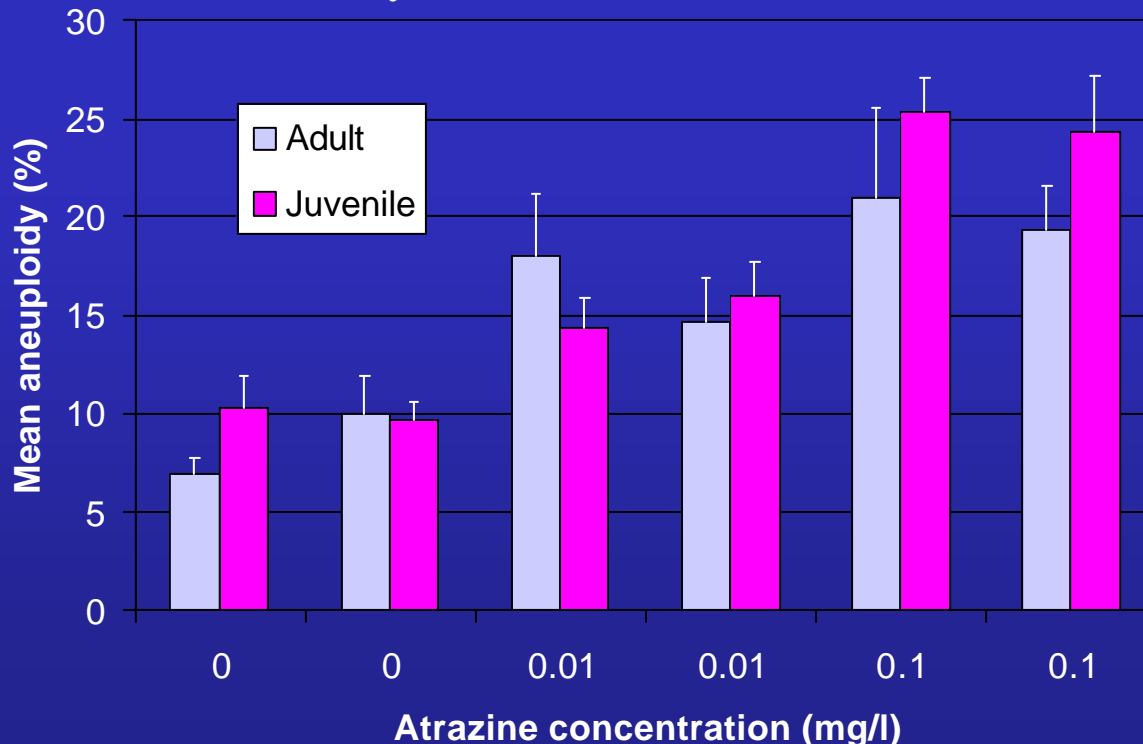
Atrazine exposure

- *Crassostrea gigas* adults and juveniles: two months and three and a half months of atrazine exposure respectively
- Three treatments: (1) no atrazine, (2) 0.01 mg/l atrazine and (3) 0.1 mg/l atrazine
- Two replicates



Impact of atrazine on aneuploidy

- Positive relationship between atrazine and aneuploidy in *Crassostrea gigas* adults and juveniles (Bouilly et al., 2003, Environ Toxicol Chem 22:219-223)



Persistence of this impact?

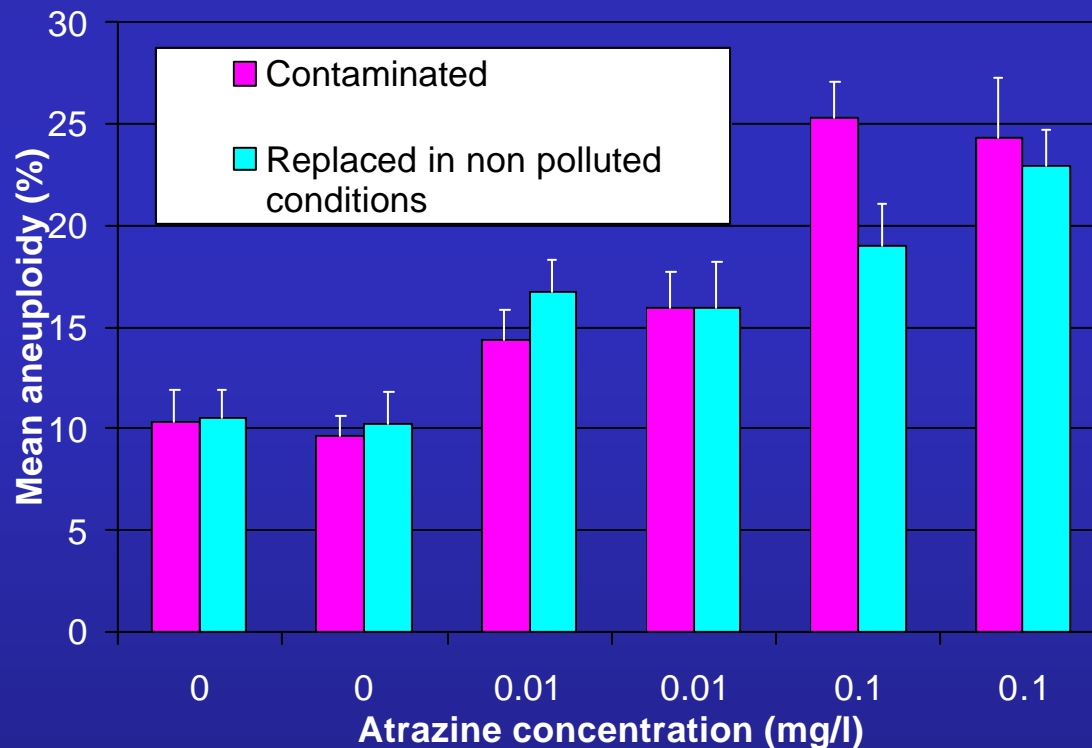
- Juveniles exposed to atrazine transferred to non-polluted conditions for two and a half months



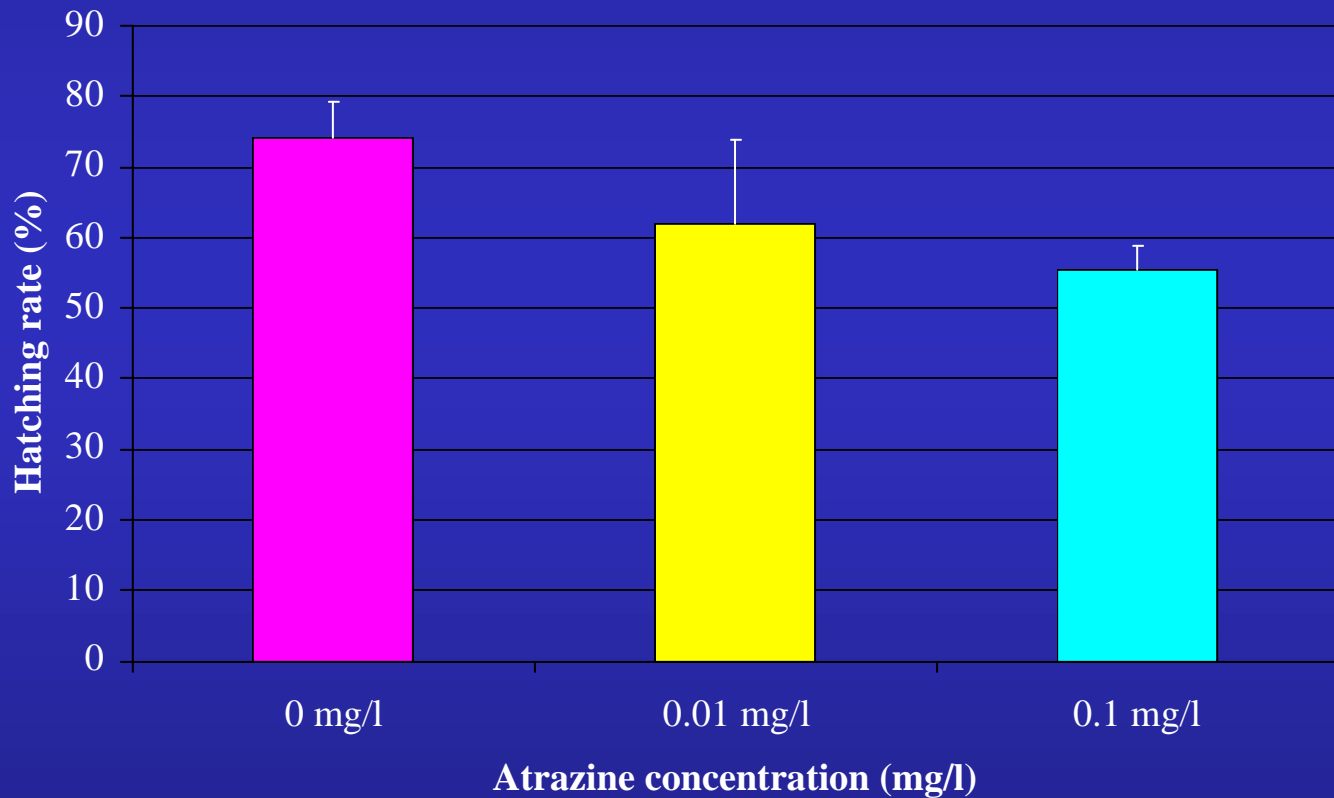
- Offspring of the same adult population previously treated



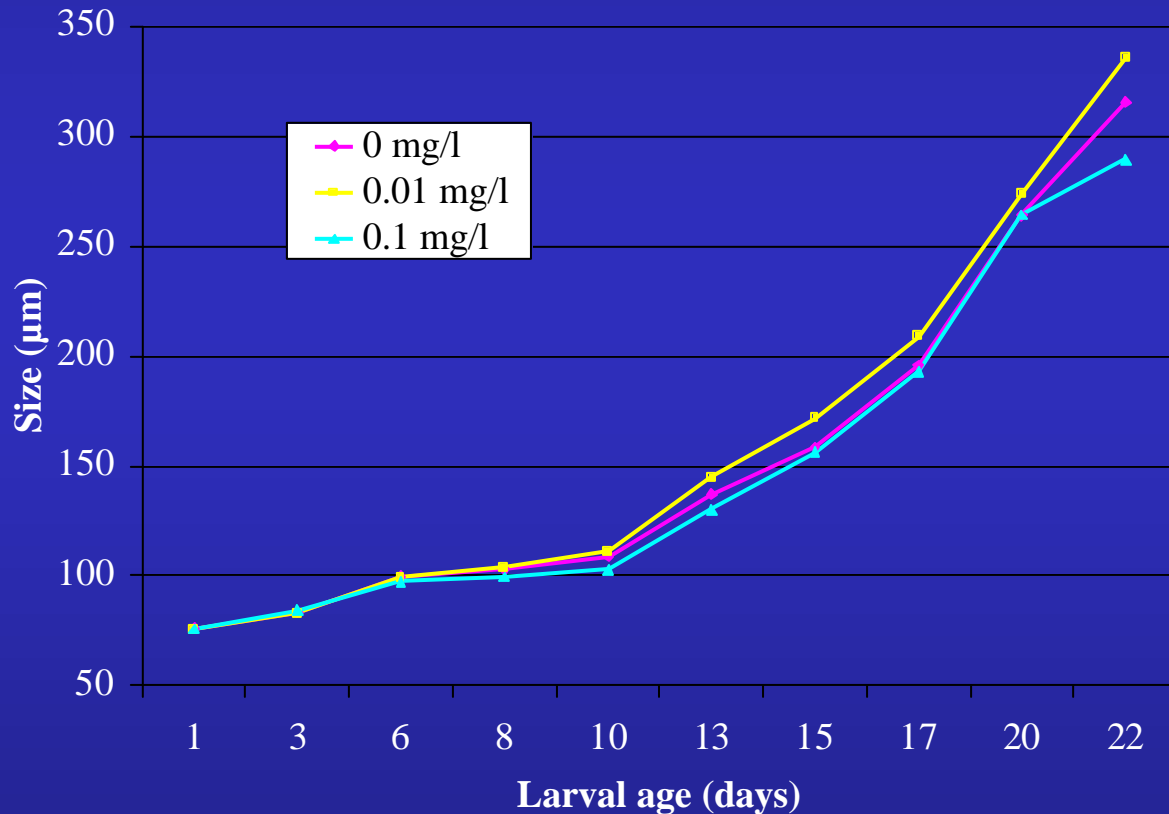
Persistence of atrazine impact in time



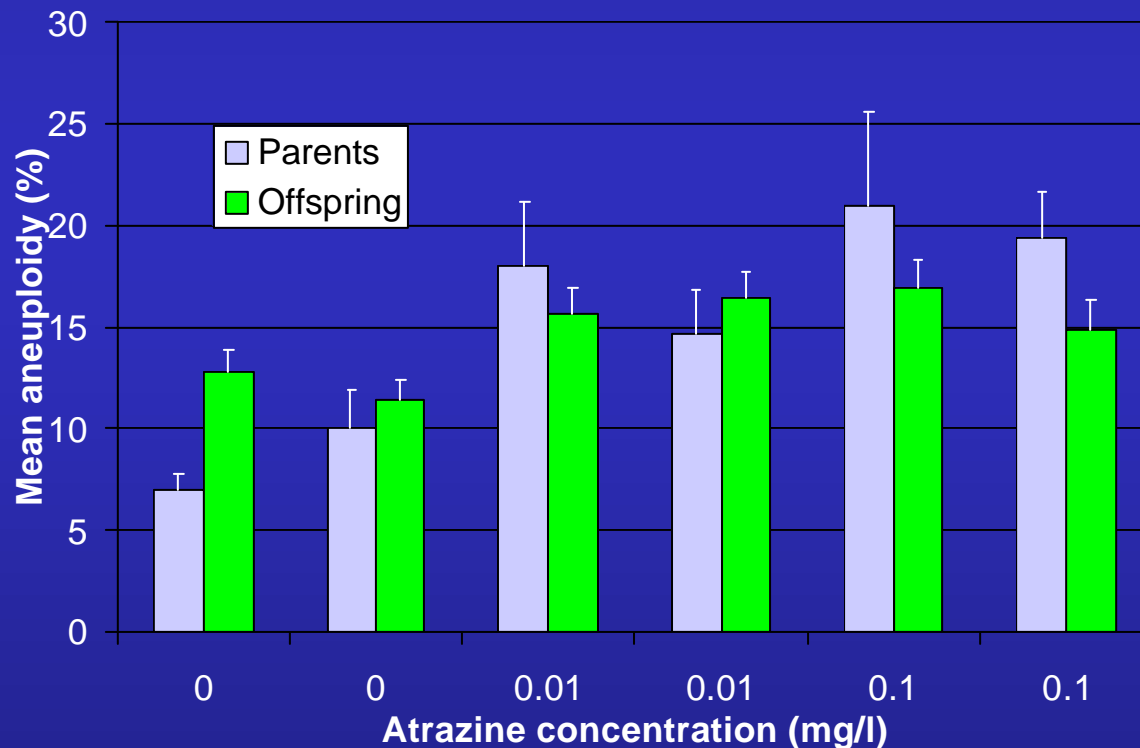
Atrazine impact on hatching rate



No atrazine impact on larval growth



Persistence of atrazine impact between generations



Conclusion



- Evidence for an environmental effect on aneuploidy in *Crassostrea gigas*
- Significant differences in the hatching rate but no difference in larval growth
- Significant differences in aneuploidy level among the treatments
- **Persistence of atrazine impact on Pacific oyster aneuploidy in time within and between generations**



Thanks to...



- Conseil Général of Charente-Maritime
- Laboratory of Genetics and Pathology of



- NSA

Thanks for your attention...