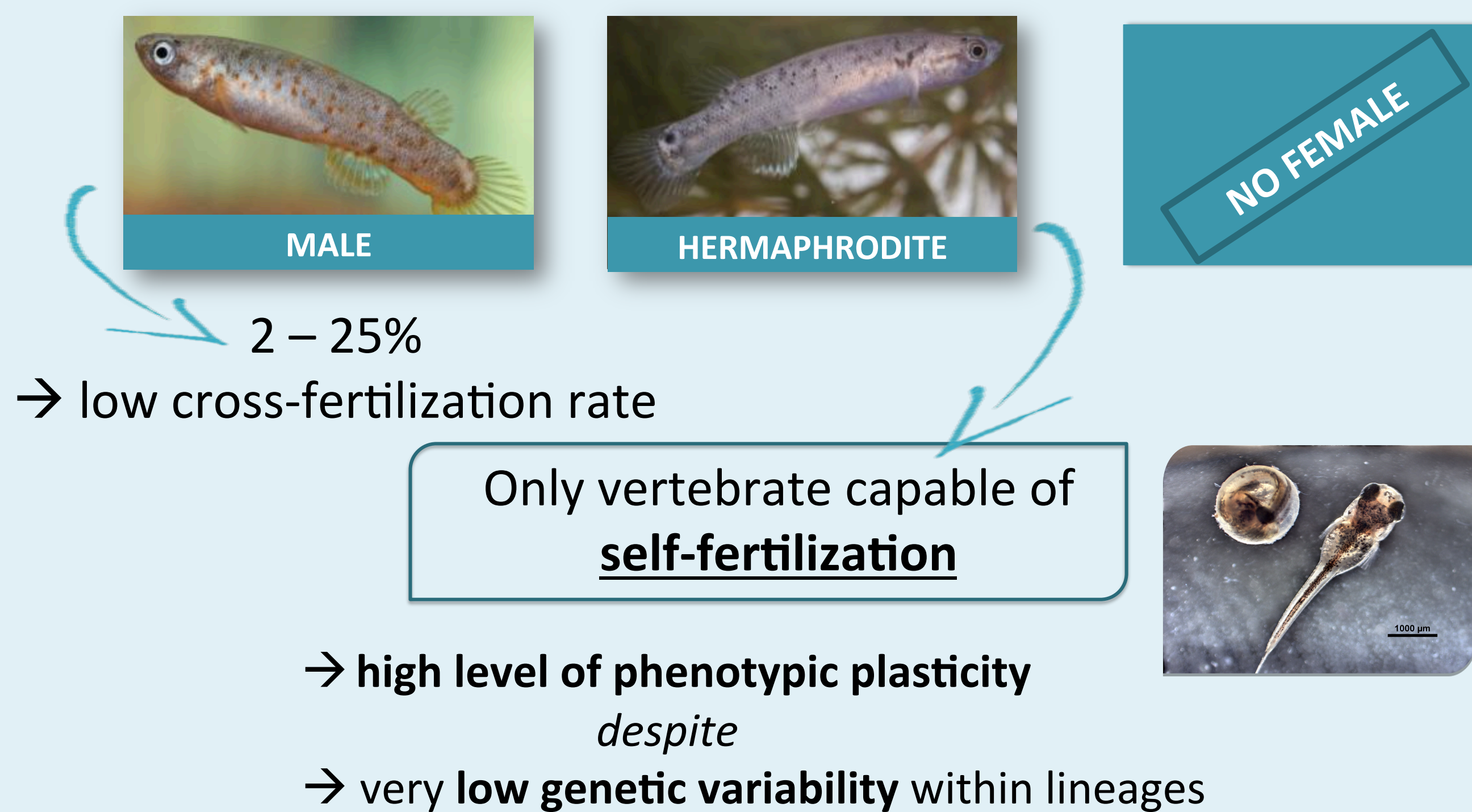


1. Model species: *Kryptolebias marmoratus*

Androdioecious populations



Mangrove rivulus characteristics allow the identification of genetic and environmental sources of phenotypic plasticity



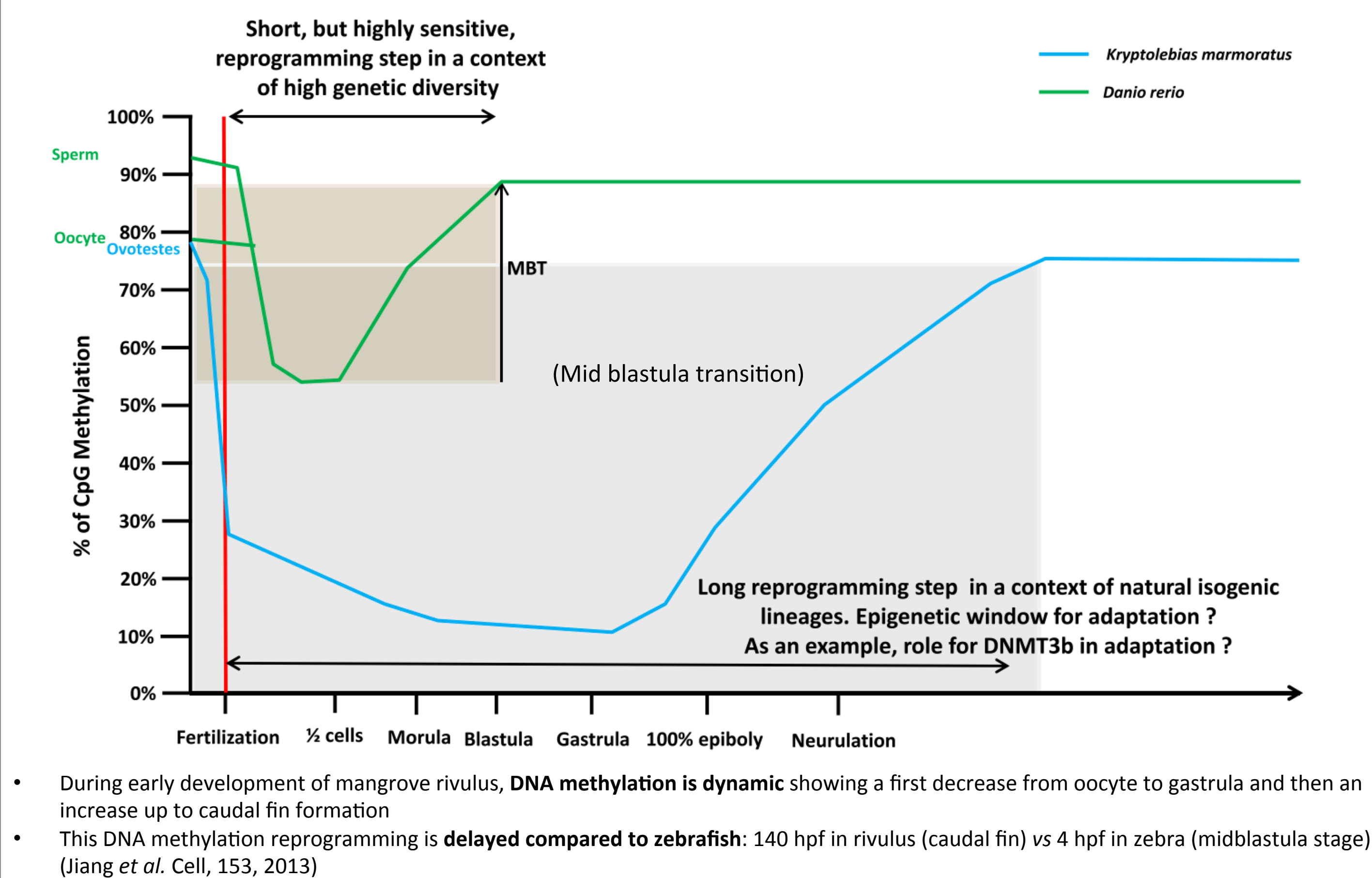
2. Research questions

Phenotypic plasticity is increasingly emphasized as a crucial process for population survival when facing environmental changes...

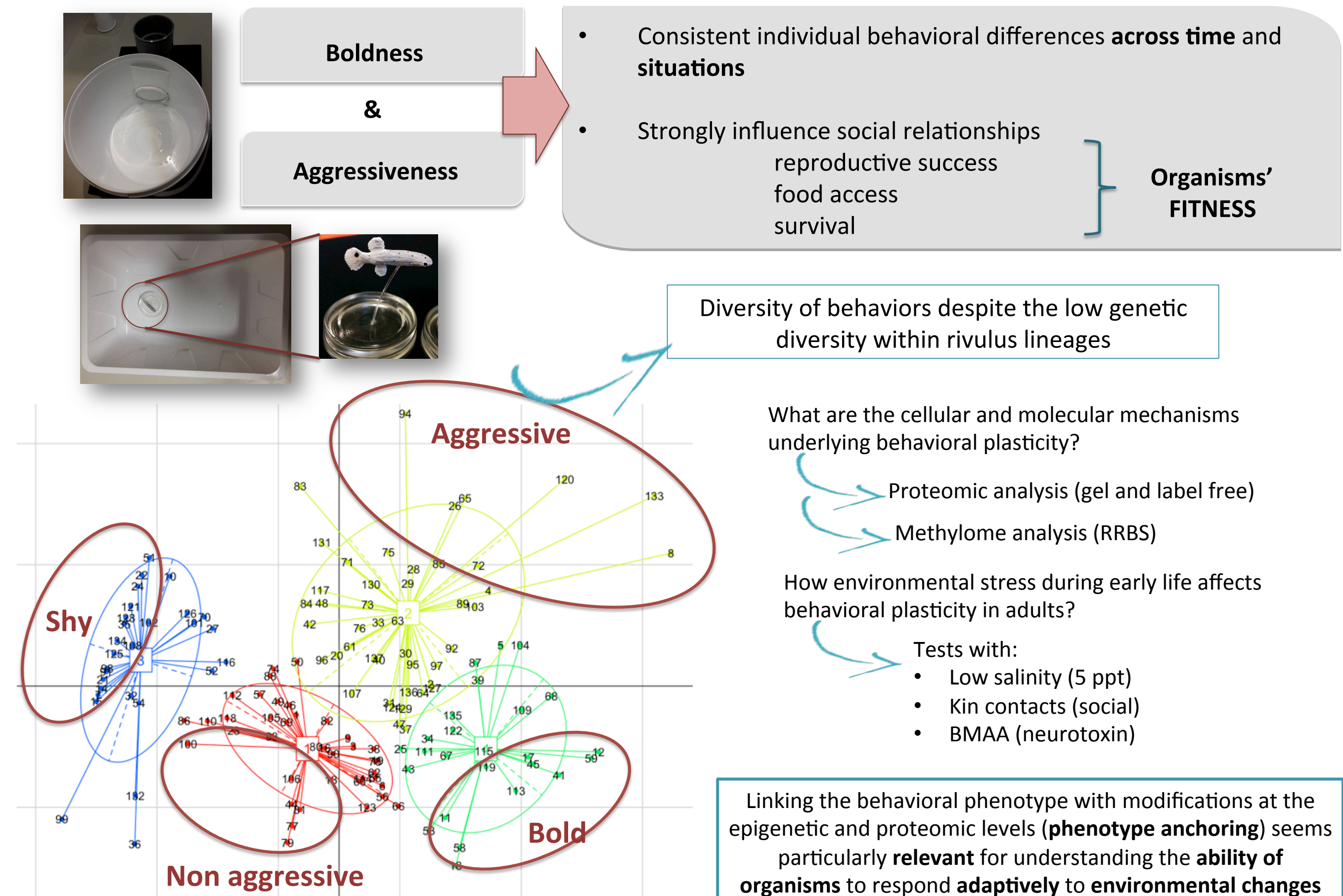
1. Can **phenotypic plasticity** compensate for **low genetic diversity** in a harsh and changing environment?
2. What are the **cellular** and **molecular mechanisms** underlying phenotypic plasticity?
3. Can environmental stress affect the **epigenome** during **early development** and consequently the **phenotype in adults** or even **further generations**?

3. Ongoing work

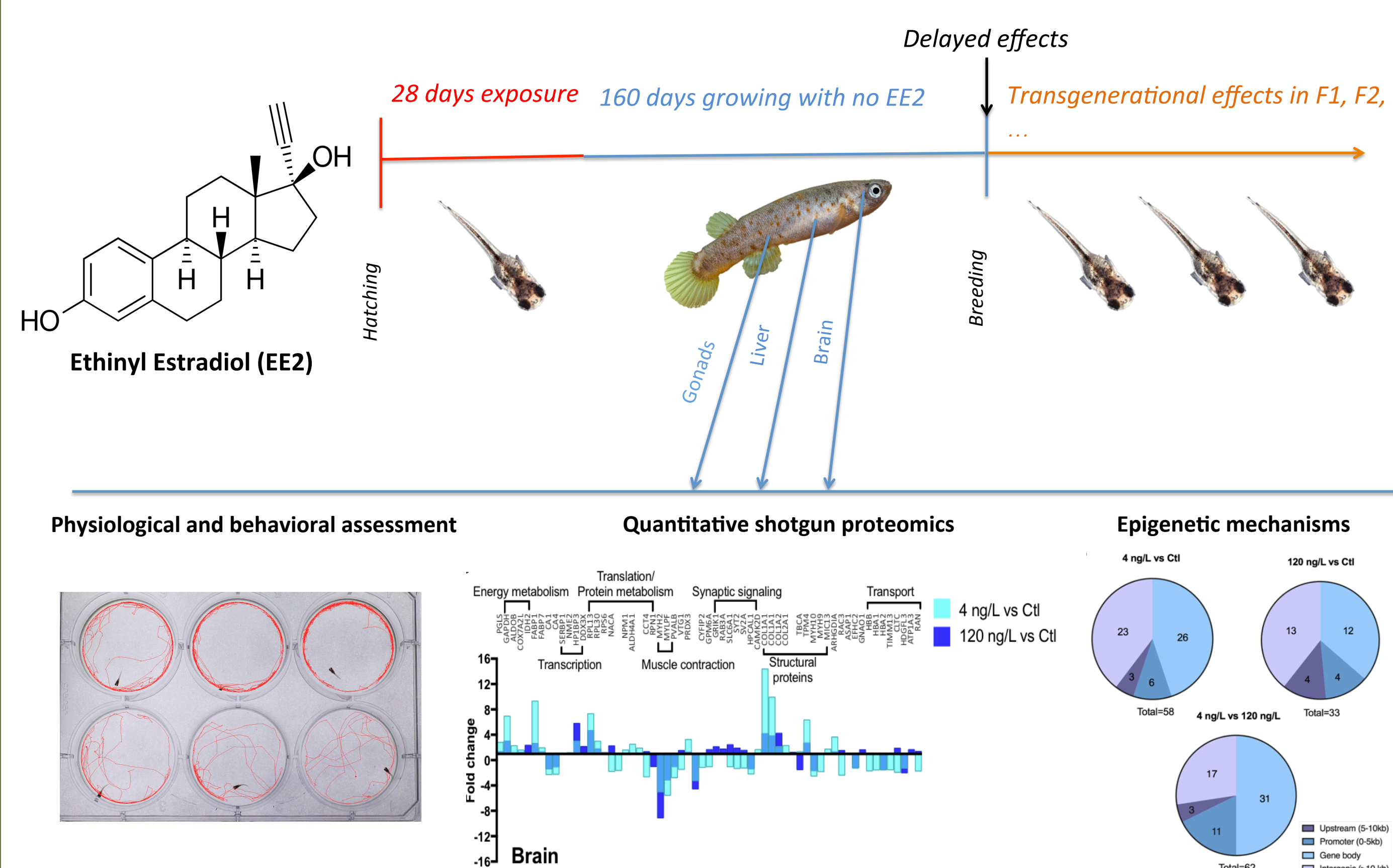
Dynamics of DNA methylation reprogramming in rivulus embryos



Behavioral analyses on rivulus



Delayed effects of early-life exposure to EE2

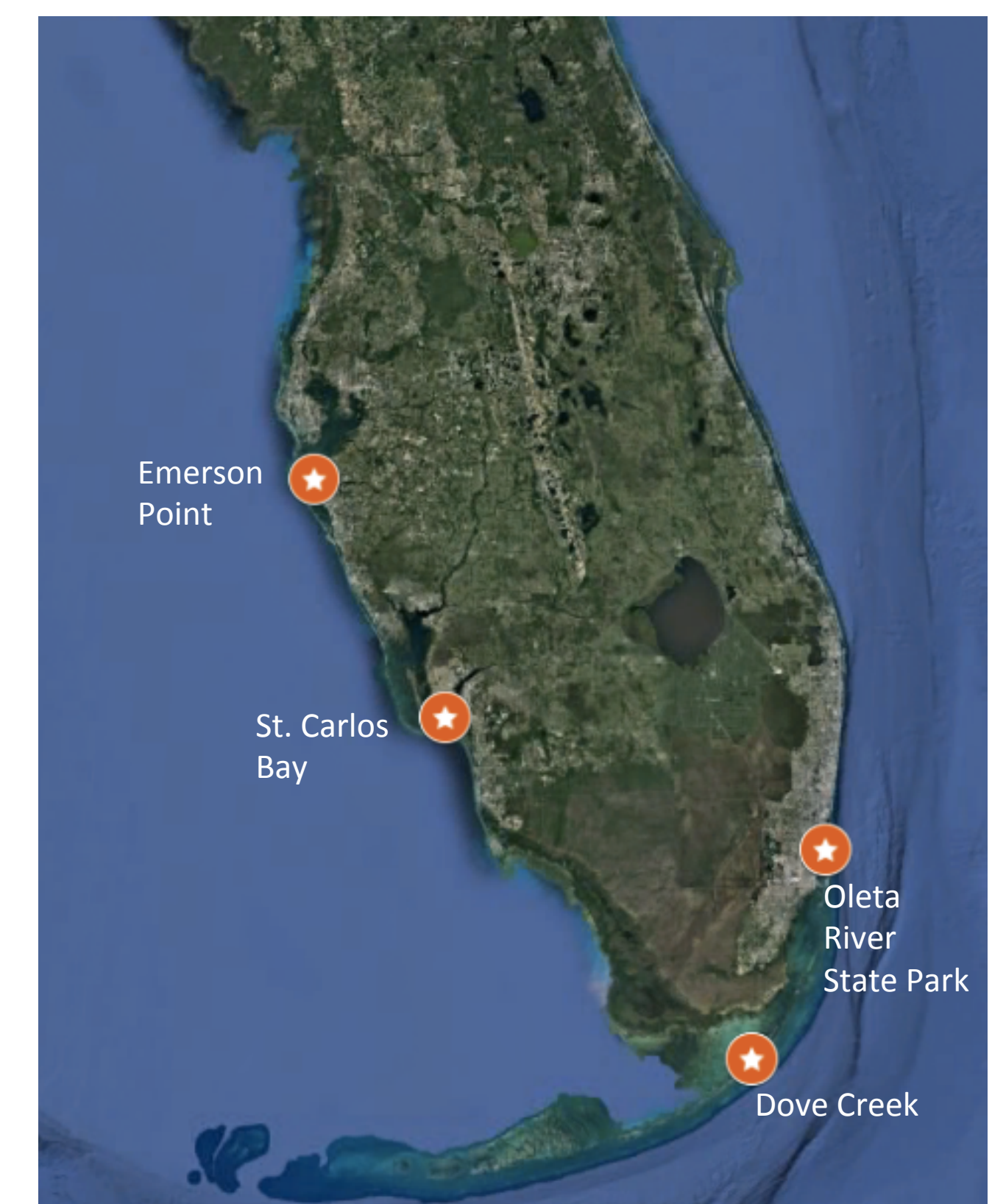
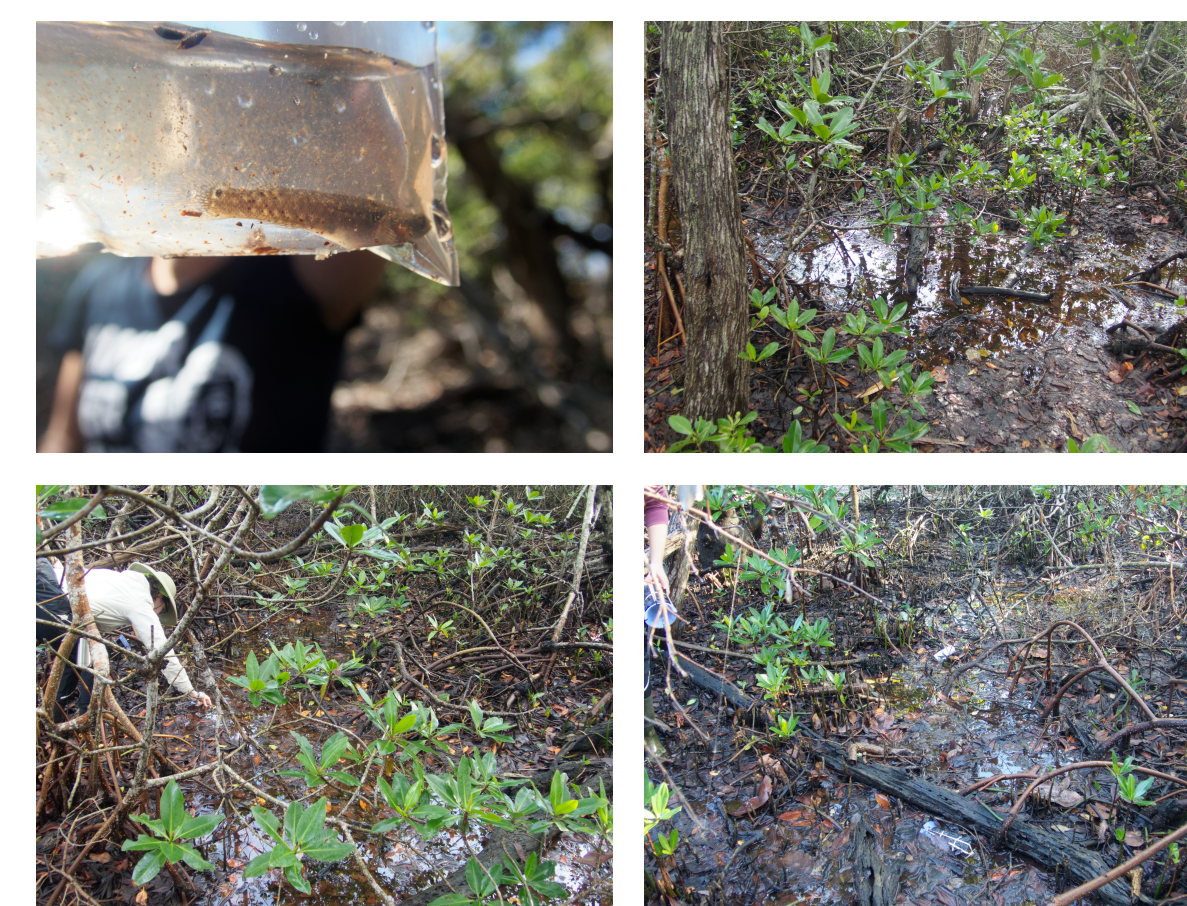


Epigenetic diversity of wild rivulus populations

The mangrove rivulus inhabits the mangrove-lined coasts of South Florida (USA), in a variety of microenvironments

Individuals were captured at different sites, which were characterized based on: temperature, salinity, conductivity and dissolved oxygen, using a handheld YSI multiparameter meter

Their genetic and epigenetic diversity are being quantified and compared, both across and within lineages



4. Acknowledgements

- This research is supported by a FNRS grant N°T.0174.14 (Epigenetics in the mangrove rivulus), a FNRS doctoral fellowship to A. Carion and A.-S. Voisin and FNRS postdoctoral support to A. Fellous and V. Suarez-Ulloa
- Collection of rivulus individuals was possible through a permit from the Florida Fish and Wildlife Conservation Commission (Permit #SAL-09-1132B-SR to RLE) and the Florida Dept. Of Environmental Protection (#01121810)
- Proteomic analyses were performed at Prof. Dietmar Kültz's lab, University of California, Davis, USA
- Thanks to all the Master students who participated in these projects

5. Currently published

- Fellous A, Voisin A.-S, Early RL & Silvestre F (2018) DNA methylation in adults and during development of the self-fertilizing mangrove rivulus, *Kryptolebias marmoratus*. *Ecol. Evol.* 0: 1–18
- Voisin A.-S, Fellous A, Earley RL & Silvestre F (2016) Delayed impacts of developmental exposure to 17-alpha-ethinylestradiol in the self-fertilizing fish *Kryptolebias marmoratus*. *Aquat. Toxicol.* 180: 247–257

DNA methylation in mangrove rivulus is peculiar compared to other fish species. Further studies will investigate:

- the functional meaning of a late DNA methylation reprogramming
- the genome-wide DNA methylation during the reprogramming and differential patterns between spermatozoa and oocytes
- the enzymes involved in DNA methylation/demethylation processes
- the hypothetical link between phenotypic diversity and DNA methylation
- mechanisms of transgenerational epigenetic inheritance

All together, this model species will provide insights into the role of epigenetics in shaping phenotypes and into the consequences of exposure to pollutants during early life stages