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## #278 - IONIZING RADIATION OF *GAMMARUS FOSSARUM* AFFECT THEIR REPRODUCTION BUT NOT THEIR FOOD CONSUMPTION<sup>20</sup>

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### CONTEXT - ECOLOGICAL RADIATION PROTECTION (ERP) & ENVIRONMENTAL SPECIES

- Several reference levels for ERP (exposures <-> effects)<sup>1-4</sup>: 10 - 400  $\mu\text{Gy}\cdot\text{h}^{-1}$  + Derived Considered Reference Levels (DCRLs) for 'reference animals and plants' (RAPs).
- Among the limits: amount of data + some inconsistencies between available RAPs and the diversity of the species in the ecosystems<sup>5</sup> => (non parthenogenetic) CRUSTACEANS<sup>6,7</sup>.
- Amphipods *Gammarus fossarum*: sexual reproduction, often abundant in aquatic lotic ecosystems, sensitive to the quality of the environment, biologically well described in ecotoxicology, bioindicator of water quality, used as sentinel organisms<sup>8-12</sup>.



### MATERIAL & METHODS

- Cs-137 (4x111GBq) - 5 decades of dose rates (DR) (0.005 - 50mGy.h<sup>-1</sup>) + 1 control
- Irradiation of males or females at 16°C



#### Measured parameters



Mortality



Food consumption



Oocyte production number (cycle n)

Embryo production number (from oocytes cycle n-1)

Embryo number after reproduction post-irradiation (females and males)

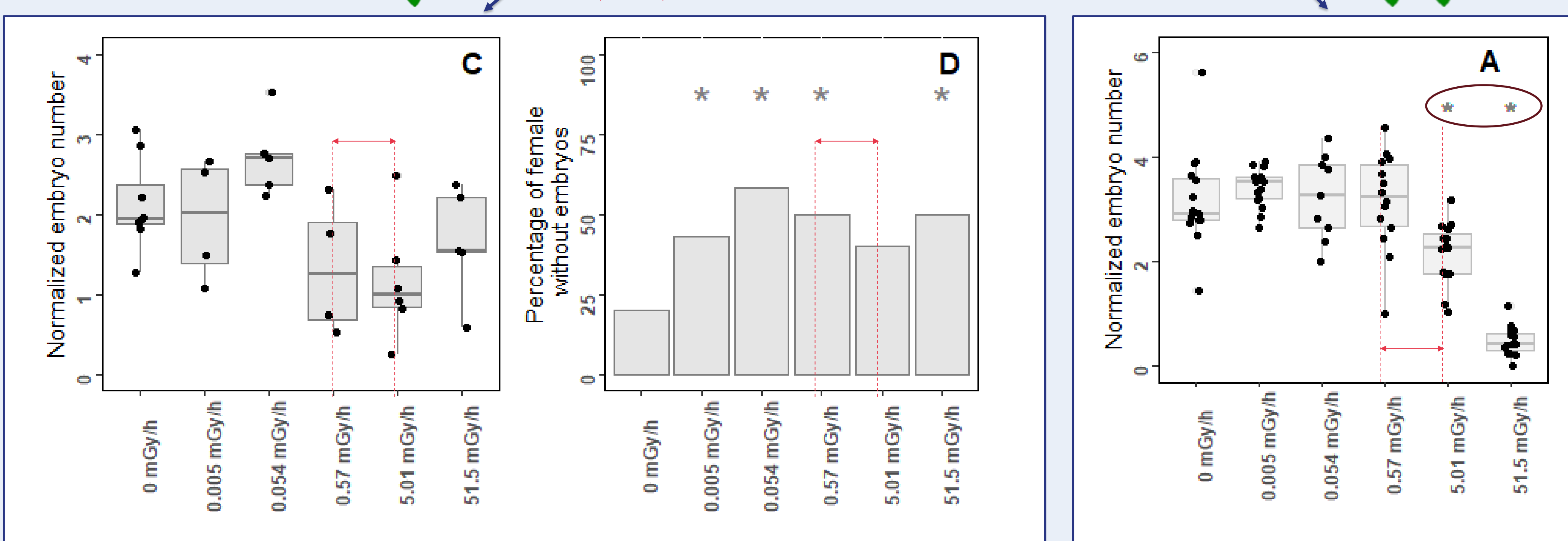
### RESULTS

#### POST-IRRADIATION REPRODUCTIVE CAPACITIES

Females

Males<sup>15</sup>

ICRP DCRL for crustaceans



- Reproductive capacity -> most radiosensitive life history trait
- Reprotoxicity more severe for males than females
- Toxicity at lower dose rates than for parthenogenetic species<sup>16</sup>
- Per se, results don't question DCRLs for crustaceans but only one generation irradiated.
- Realistic exposure (multi-generational) is likely to yield higher effects at much lower dose rates.

	×		×	<sup>14</sup> Dufourq-Sekatcheff et al. 2023
	×		×	<sup>13</sup> Fuller et al. 2018

### PERSPECTIVES

Toxic biological pathways ? => **GAMMARRI Project**: irradiation of couples, proteomic analysis, dose response curves<sup>17</sup>, Weighted Gene Coexpression Network Analysis<sup>18</sup>, AOP fueling<sup>19</sup>

