

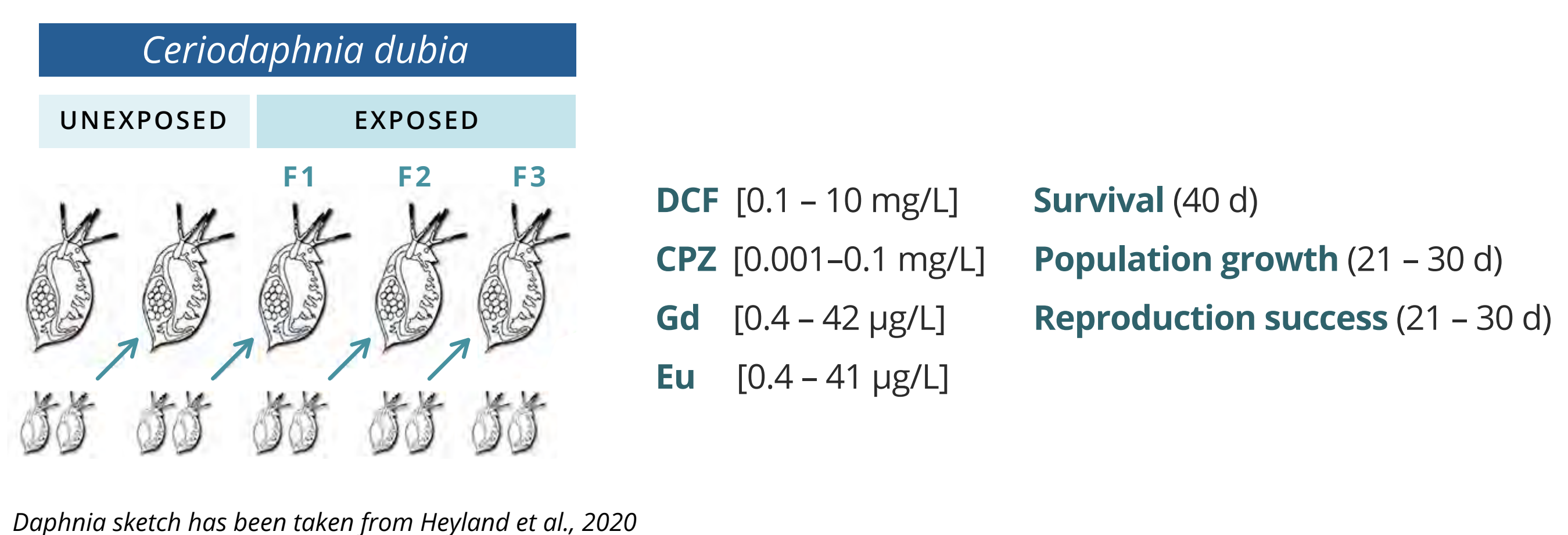
Long-term toxicity of chlorpromazine, diclofenac and two lanthanides on three generations of *Ceriodaphnia dubia*

Newly emergent toxicants such as rare earth elements are found in rivers and surface waters due to extensive use in high technologies and medicine. Their occurrence in the aquatic environment alongside pharmaceutical compounds may threaten living biota even at very low concentrations.



In the study, we show that the anti-inflammatory drug diclofenac, the psychotropic drug chlorpromazine and two lanthanides, gadolinium and europium, diminish the survival and reproduction capabilities of *Ceriodaphnia*, a water flea species. The least sensitive to all selected substances was the first daphnid generation; however, toxicity effects were evident in the second and third generations.

Highlights



- Effects of pharmaceuticals (diclofenac and chlorpromazine) and lanthanides (Gd and Eu) on survival, population growth and reproduction were studied in three generations of *C. dubia*.
- The least sensitive to all selected substances was the first daphnid generation.
- At tested concentrations, the survival was not affected within 21 days by CPZ in generations F1–F3 and DCF in F1.
- Lanthanides reduced survival, population growth and reproduction success of daphnids in the F2 generation for Gd and generations F2 and F3 for Eu starting from 4 µg/L.
- Ceriodaphnia dubia* as a test organism can be used for 21 days in multigenerational investigations.