

Do silver nanoparticles influence the fish kairomone induced anti-predator defence response in *Daphnia magna*?

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Introduction & Objectives

- ❖ Fish release **kairomones** into the water system, a chemical cue that *Daphnia spp.* respond to with **anti-predator defence** mechanisms, such as changes in body size and growth of the tail spine.
- ❖ **Silver nanoparticles** are exploited for their antimicrobial properties and frequently end up in wastewater treatment plant effluents.
- ❖ Nanoparticles in the aquatic system are taken up by filter feeders such as *Daphnia spp.*^[1]. The effects of silver nanoparticle toxicity on the kairomone induced anti-predator defence response is investigated.

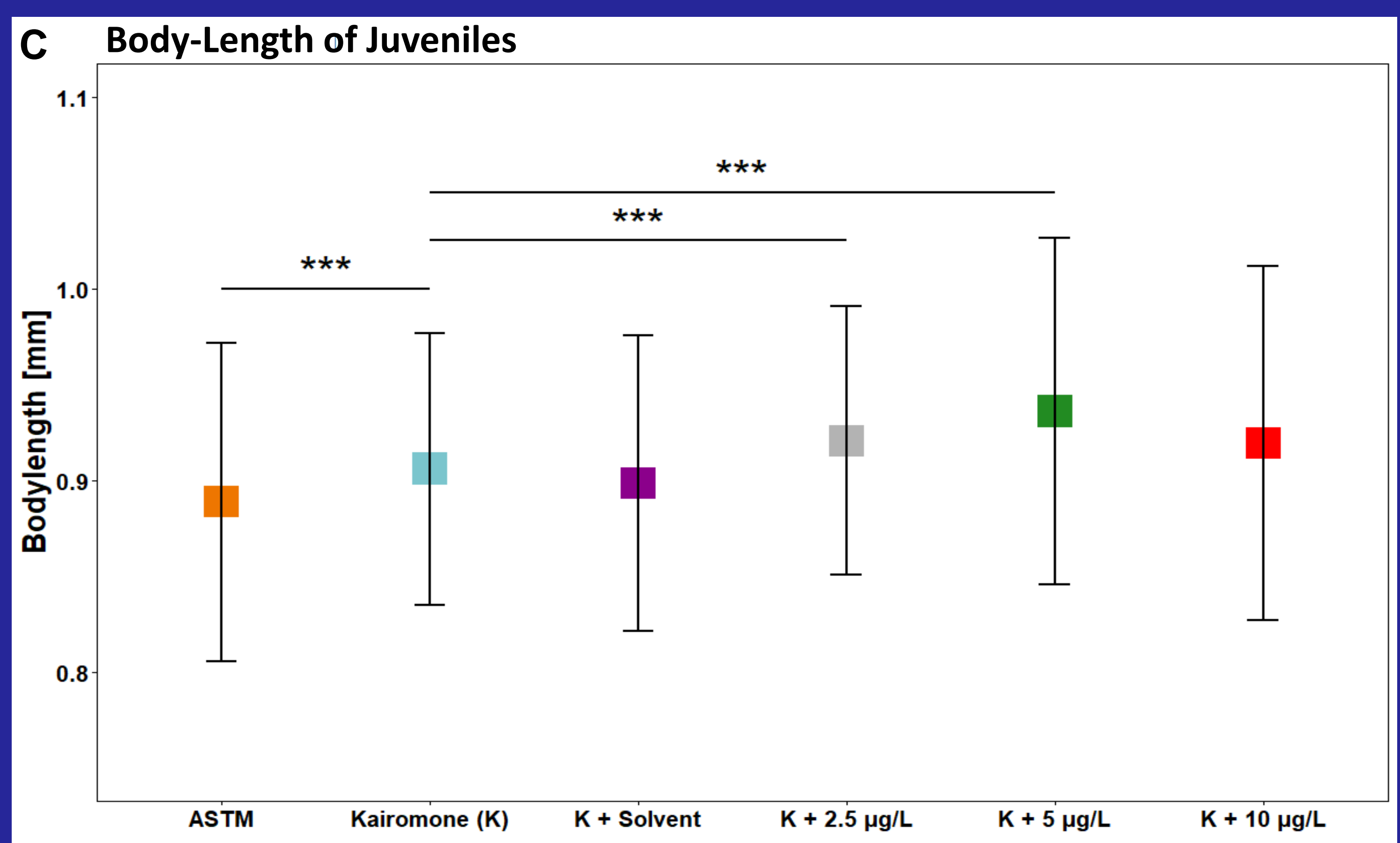
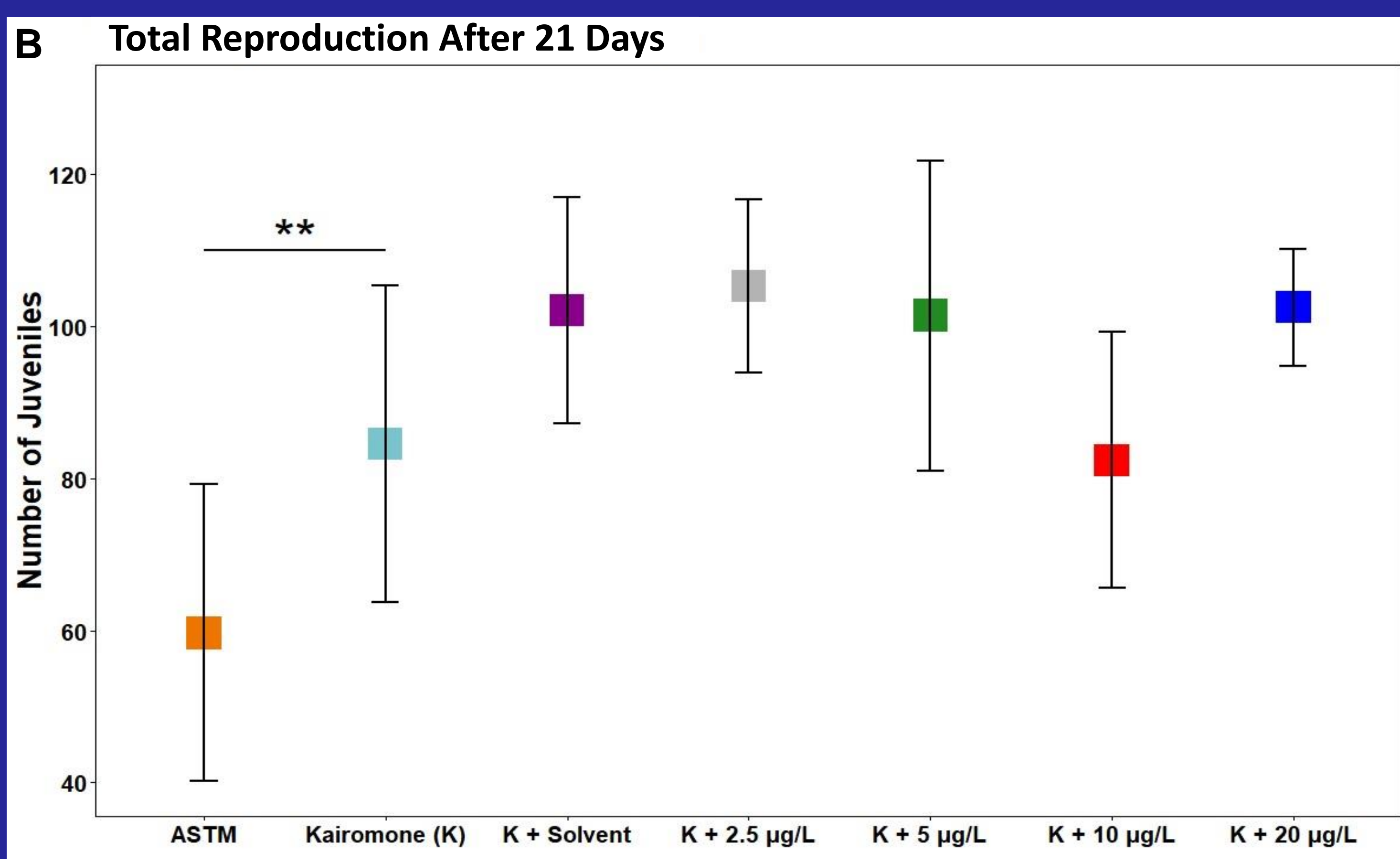
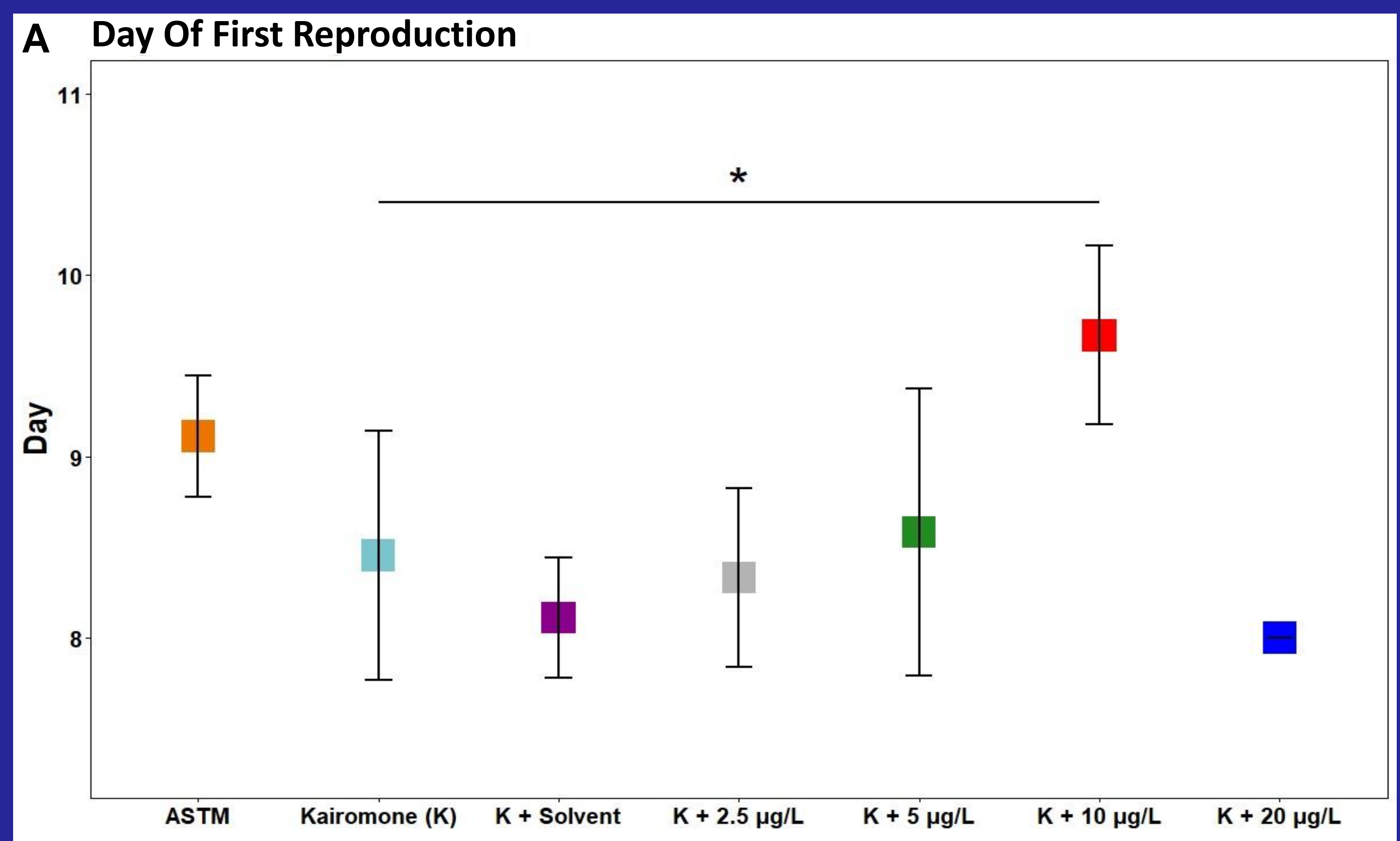
Does chronic exposure to silver nanoparticles affect the predator defence mechanism?

Materials & Methods

- ❖ Chronic exposure studies using *Daphnia magna* in accordance with OECD no. 211^[2]
- ❖ Fish kairomone stock solution taken from medium holding zebrafish at 1 fish/litre^[3]
- ❖ Silver nanoparticle (NM-300K) exposure at a range of concentrations:
 - ❖ 2.5 µg / L, 5 µg / L, 10 µg / L, 20 µg / L
- ❖ 3 Controls:
 - ❖ ASTM, Kairomone stock solution, Dispersant (NM300K-DIS)

Results

- ❖ **A** – *Daphnia* treated with Kairomone + 10 µg / L AgNP solution began **reproducing significantly later** than the kairomone control.
- ❖ **B** – Stress from **kairomones significantly increased the total number of juveniles** produced after 21 days. AgNPs in addition to the kairomone stock solution had no effect on the total reproduction.
- ❖ **C** – Juveniles produced by mothers exposed to kairomones have a larger body-length. The body-length of juveniles from 2.5 and 5 µg / L AgNP exposed mothers are **significantly larger** than those from the kairomone control group.



Discussion & Conclusion

- ❖ Stress from kairomone and AgNP exposure results in a significant **increase in rate of reproduction and body-length** in juveniles.
- ❖ AgNP furthers the anti-predator defence response in *Daphnia magna*.

References

Acknowledgements

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