

Potamopyrgus antipodarum in outdoor stream mesocosms

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INTRODUCTION

The New-Zealand mudsnail *Potamopyrgus antipodarum* is used as model organism in laboratory experiments¹. To get information of the sensitivity of the mudsnail in higher tier experiments this study aimed to establish the species in outdoor stream mesocosms (located at Mesocosm GmbH/Homberg (Ohm)) and validate the results with a proposed reference chemical. To achieve this goal the aims were to I Adjust the medium to the properties of *P. antipodarum*, II Ensure survival and reproduction, III Apply tributyltin (TBT).

MATERIAL & METHODS

Four outdoor stream mesocosms were filled with semi-artificial medium consisting of 50% piped water and 50% stream water with TropicMarin sea salt and NaHCO₃. The aim was to achieve a conductivity of 770 ± 100 µS/cm. Bio-assays (10 individuals) and 250 individuals *P. antipodarum* were introduced in every stream additionally. The study was realised in two experiments.

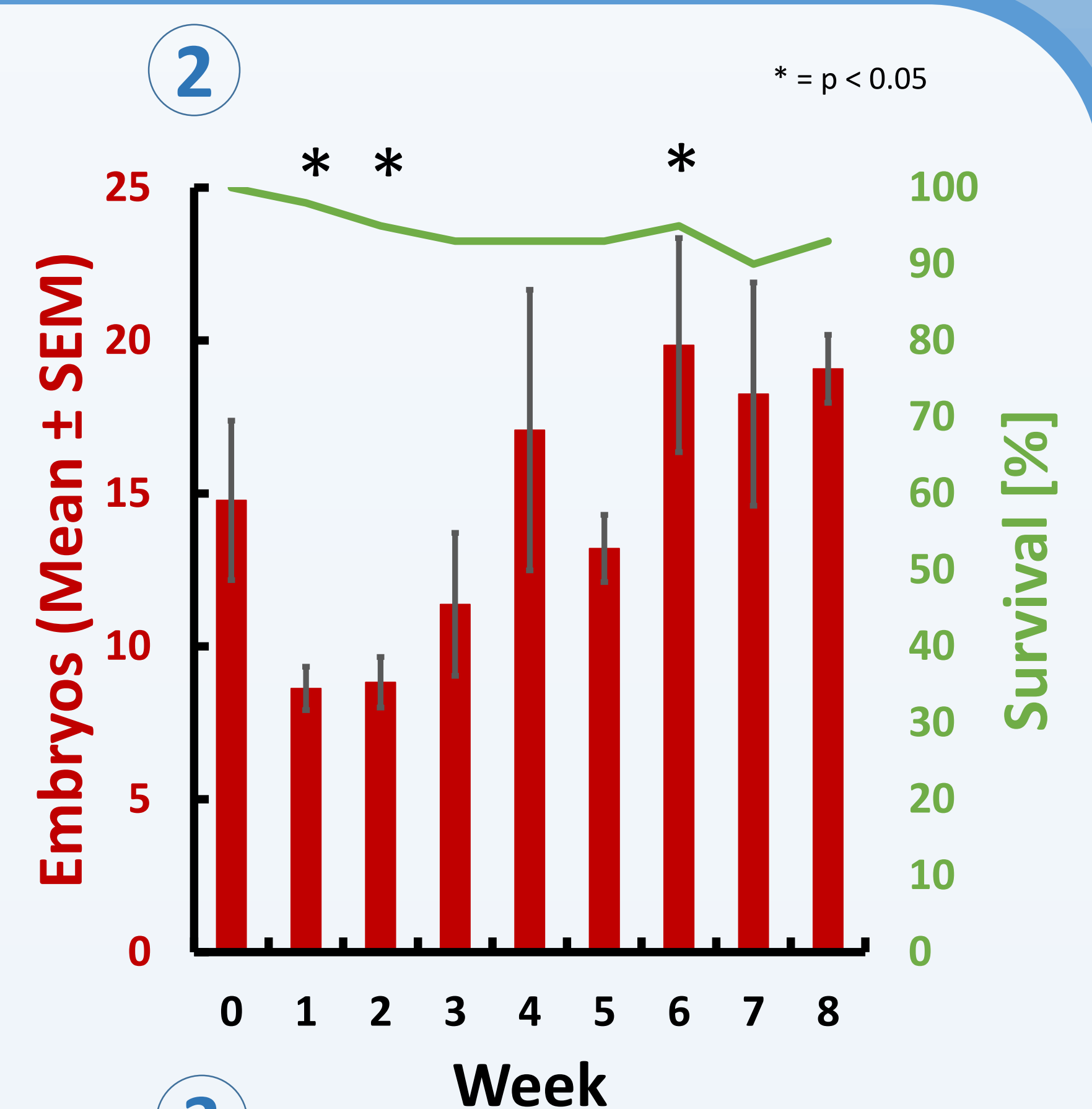
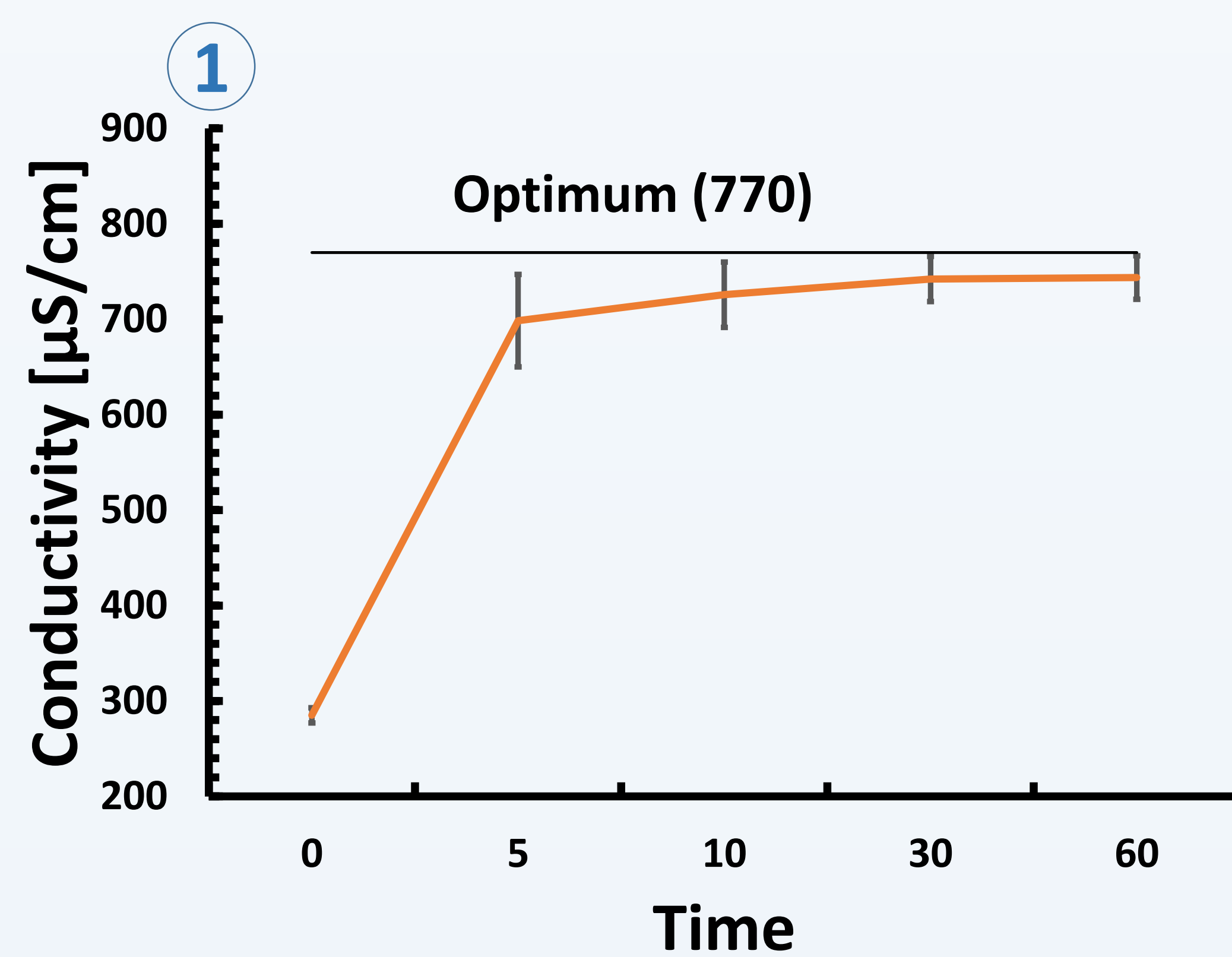
1. Establishment (I + II)
 - a. Adjustment of the medium
 - b. Survival
 - c. Reproduction

of *P. antipodarum*

2. Validation (III)

→ Sensitivity (to TBT) comparison to laboratory results.

RESULTS



CONCLUSION

I The stream mesocosm water was adjustable to the needs of *P. antipodarum*. After 10 minutes the calculated conductivity range was reached in all replicates without the need of solving the salts before the addition (Figure 1).

II The New-Zealand mudsnail survived and reproduced in both the bio-assays (Figure 2) and directly in the stream water body (Figure 3). The stream population showed no significant differences in number of embryos to the control, while the individuals in the bio-assays showed significant lower numbers in weeks 1 and 2 and higher numbers in week 6. This can be explained by the fact, that the reproduction rate is temperature dependent² and the bio-assays were more exposed to the sun radiation.

III No significant effects of TBT on the reproduction of *P. antipodarum* were detectable in the experiment. The chemical might have degraded too fast, due to temperature and microbial activity to have chronic effects.

➔ *P. antipodarum* is a suited test organism in outdoor stream mesocosms. Further studies with other substances, populations, different media and other test systems are advisable.

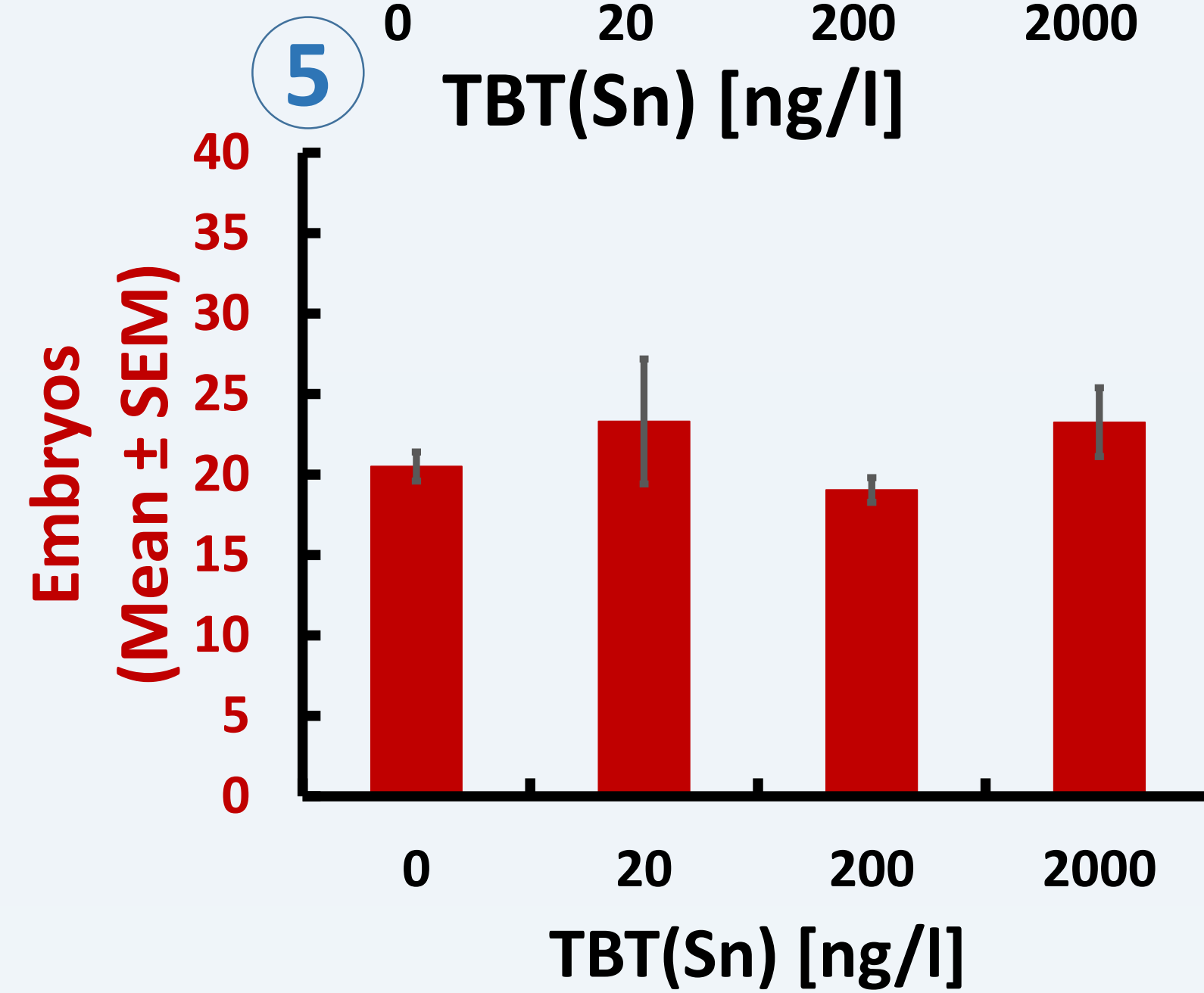
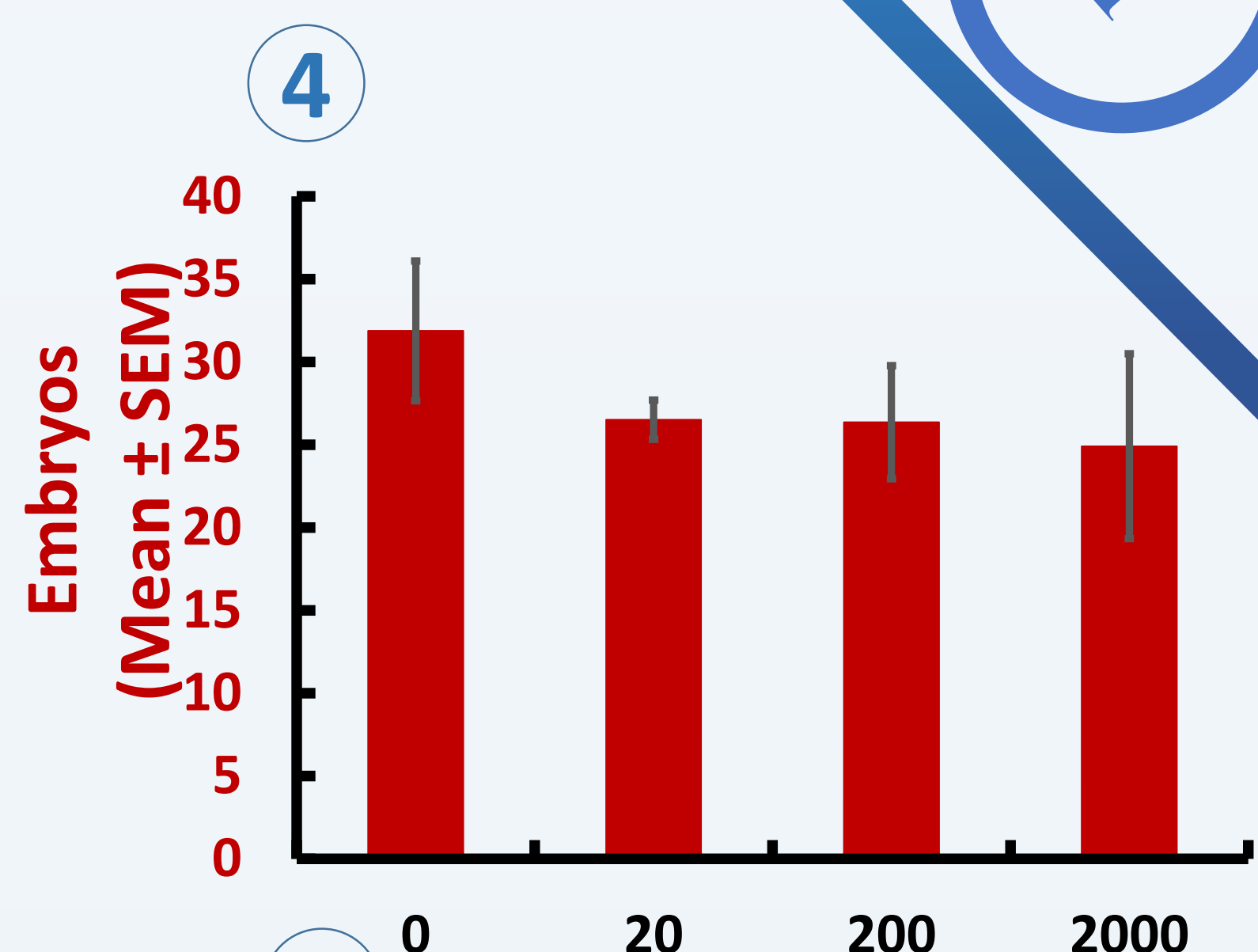


Figure 4+5: Mean number of embryos of *P. antipodarum* in bio-assays after 28 days. Two different populations were used. Figure 4: Organisms were under laboratory conditions for > 6 months. Figure 5: Under laboratory conditions for ~ 3 months.

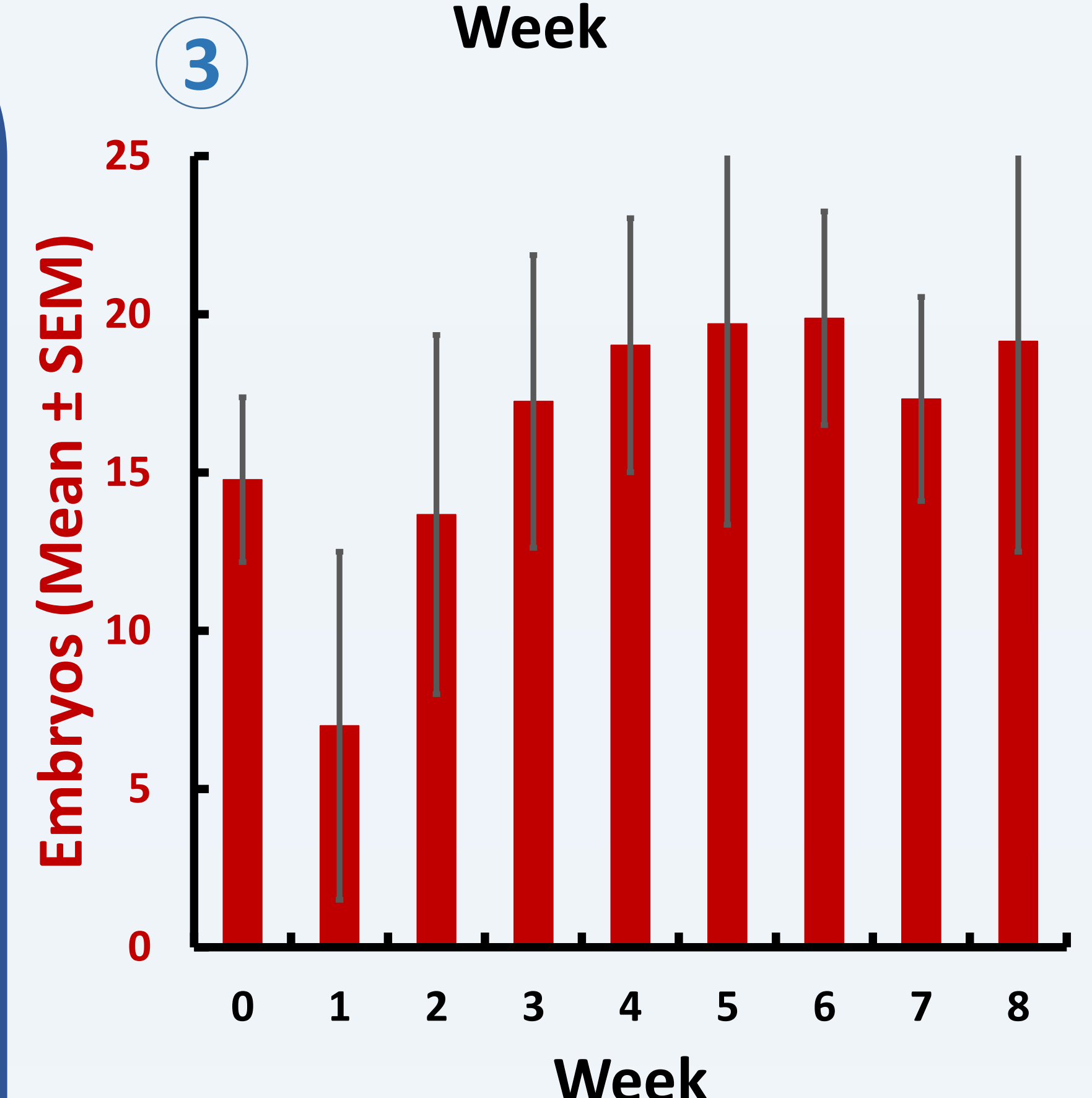
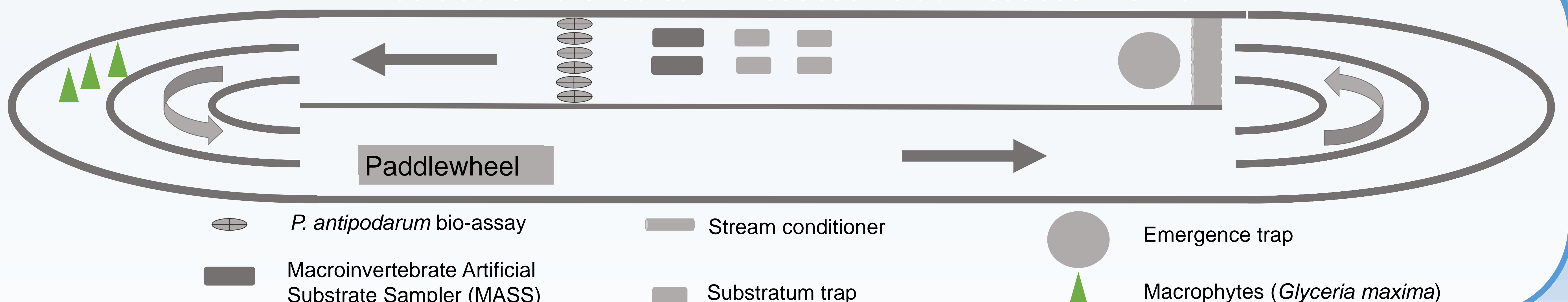


Figure 1: Semi-artificial medium adjustment. Conductivity [µS/cm] over time. t=0: addition of soluble salts

Figure 2: Mean number of embryos and survival of *P. antipodarum* in bio-assays over an eight week period.

Figure 3: Mean number of embryos of *P. antipodarum* originating the stream population.

Basic schema of stream mesocosms at Mesocosm GmbH



Additional sources

1:



2:

