MAXIMISING SPECIES ABUNDANCE COUNTS IN MESOCOSMS: WHAT TRAPS WORK BEST?

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CAMBRIDGE ENVIRONMENTAL ASSESSMENTS

BACKGROUND:

- Aquatic mesocosms simulate field-edge water bodies.
- Macroinvertebrate and emergent insects often serve as key taxa, due to their sensitivity in higher-tier ecological risk assessments.
- Life stage, habitat use, and seasonal variation affect sampling success.
- Targeted trap deployment, across environmental niches, enhances data quality and organism recovery.
- Mesocosm design should consider species, life-stage, sensitivity, stressor, and seasonal factors.

AIMS:

- To share our expertise on the selection, design and deployment of macroinvertebrate and emergent insect traps in mesocosm studies.
- Open discussions on the representativity of mesocosm studies for these taxa.
- Help to optimise the experimental design of future mesocosm studies.

MESOCOSM TRAPS/COLLECTION METHODS

Sweep net

- **Size: 250 mm diameter.**
- **Method: 1mm mesh, water column swept in a figure of "8" for 15 seconds**
- **Sampling region: Water column**

Sunken Stone Basket

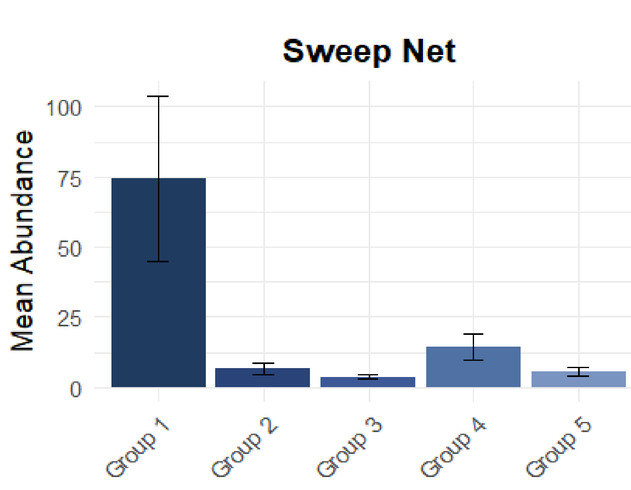
- **Size: 200 mm x 200 mm x 75 mm**
- **Method: Sunken trap encased in 280 µm mesh, closes on retrieval.**
- **Sampling Zone: Benthos**

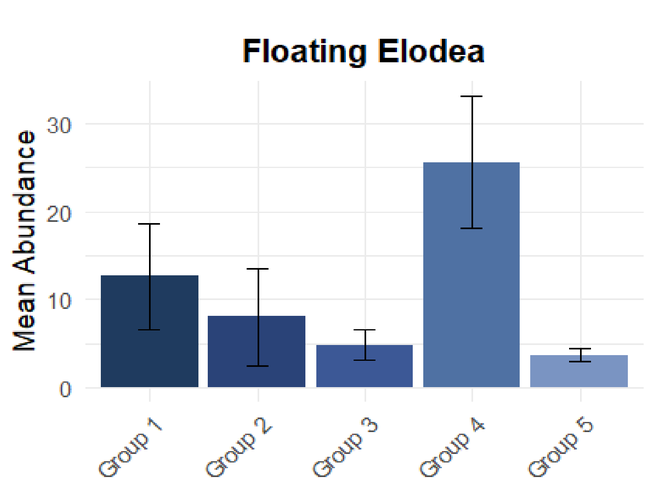
Caged Sunken Elodea

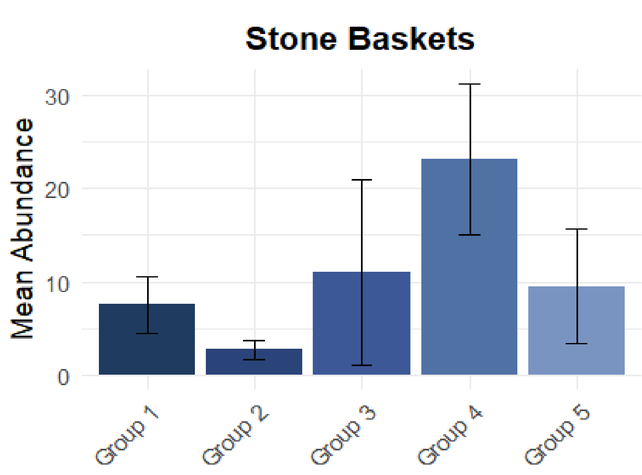
- **Size: 185 mm x 185 mm x 90 mm**
- **Method: Sunken trap containing *Elodea* sp, retrieved within 1mm mesh to mitigate invertebrate loss.**
- **Sampling Zone: Benthos.**

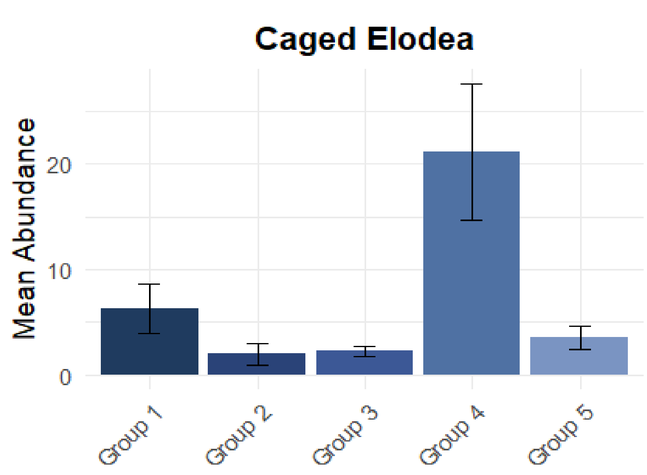
Floating Elodea trap

- **Size: 222 mm x 210 mm.**
- **Method: Floating wire basket containing *Elodea* sp, retrieved within 1mm mesh to mitigate invertebrate loss.**
- **Sampling Zone: Surface.**









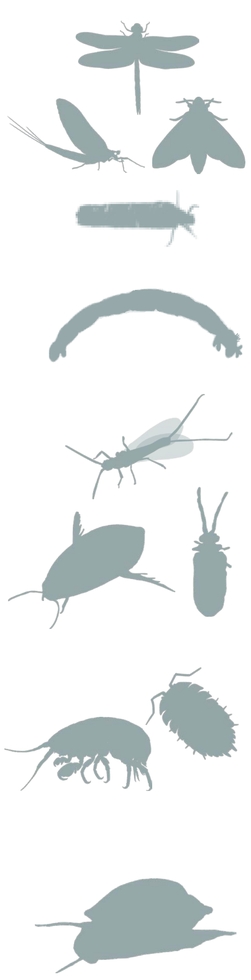
Group 1: EPT, Odonata, Lepidoptera and Megaloptera

Group 2: Diptera

Group 3: Hemiptera, Coeloptera and Arachnids

Group 4: Macrocrustacea (e.g. Amphipoda and Isopoda)

Group 5: non-arthropod invertebrates (e.g. snails and worms)



Results & Conclusions:

- Trap selection has a significant effect on sampled macroinvertebrate community composition. Sweep net sampling showed the highest abundances, particularly among EPT, Odonata, Lepidoptera/megaloptera sp, yet low abundance across other groups. Macrocrustacea abundance was found to be relatively similar across traps. Diptera, Hemiptera, Coeloptera and Arachnids varied between floating and benthic *Elodea* traps.
- Deploying a range of traps, targeting different ecological niches, ensures that sampling captures a comprehensive representation of macroinvertebrates. Providing greater statistical power in calculating endpoints and improving the likelihood of acceptance by regulators.
- Sampling approaches should be adapted dependent on the focal species. Species that may be sensitive to contaminants can be targeted by changing deployment methodology of each trap.

Find copies of all CEA posters here

REFERENCES

1 EFSA PPR Panel (EFSA Panel on Plant Protection Products and their Residues) (2013). Scientific Opinion - Guidance on tiered risk assessment for plant protection products for aquatic organisms in edge-of-field surface waters. EFSA Journal 2013; 11(7): 3290.
2 Liess, M *et al*. (2021). Pesticides are the dominant stressors for vulnerable insects in lowland streams. Water Research. 117262.