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AI →

maybe
AI?

no AI, either... → →

**DISCOVER.
EXPLORE.
UNDERSTAND.**

**A WORLD OF AQUATIC INSECTS
AWAITS.**

MSc RESEARCH OPPORTUNITIES
ENTOMOLOGY | ECOLOGY | CONSERVATION

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Master's Theses announcements in aquatic entomology (and related fields)

All Master's theses designed to comply with a 6-7 month start-finish timeframe

1. Potential of assessing biomass of selected benthic invertebrates using a multi-tag metabarcoding approach

Testing whether multi-tag metabarcoding can estimate biomass proportions in mock communities of closely related benthic invertebrates

Main research question

Can metabarcoding read recovery from several tagged primer pairs be used to estimate the biomass contribution of closely related benthic invertebrate taxa in artificial mock communities?

Specific aims

1. Construct mock communities of up to five closely related benthic invertebrate species, preferably species within the same genus or family.
2. Create communities where each species contributes equal biomass, but total biomass differs among three biomass treatments.
3. Apply several tagged primer pairs to the same mock communities.
4. Compare expected biomass proportions with recovered sequence-read proportions.
5. Evaluate how species identity, primer pair and tag combination influence biomass estimation accuracy.

Co-supervised by Manuel Curto & Simon Vitecek

2. Effects of larval density and inter-specific mosquito diversity on mosquito larval body size

Density-dependent and interspecific effects on larval growth and body size in mosquitoes

Main research question

How do larval density and species composition influence the growth and body size of mosquito larvae?

Specific aims

1. Test whether increasing larval density reduces larval body size.
2. Test whether mosquito larvae grow differently in monocultures versus mixed-species treatments.
3. Determine whether species differ in competitive effects on one another.
4. Assess whether interspecific diversity alters growth rates relative to single-species cultures.



3. Sampling sufficiency of benthic invertebrate samples

How many benthic samples are needed to estimate abundance and biomass of selected taxa at the river-stretch scale?

Main research question

How many 20 × 20 cm benthic samples are required to reliably estimate abundance and biomass of two selected benthic invertebrate taxa within a river stretch of up to 50 m?

Specific aims

1. Quantify spatial variation in abundance of two selected benthic invertebrate taxa.
2. Quantify spatial variation in biomass of the same taxa.
3. Estimate how sampling precision improves with increasing number of 20 × 20 cm samples.
4. Recommend a minimum sampling effort for river-stretch-scale estimates.

4. Use of microplastics by caddisfly shredders as food or case-building resource and effects on shredder efficiency

Do caddisfly shredders use microplastic fragments as food or case-building material, and does microplastic exposure affect shredding performance?

Main research question

Do caddisfly shredder larvae interact with microplastic foil fragments as food or case-building resources, and does exposure to microplastic reduce growth or shredding efficiency?

Specific aims

1. Test whether two caddisfly shredder taxa incorporate microplastic fragments into their cases.
2. Test whether larvae ingest microplastic fragments when fragments are associated with leaf food resources.

3. Assess whether microplastic exposure affects larval growth, survival and leaf-shredding efficiency.
4. Compare responses between two caddisfly taxa.

5. Colour vision in caddisfly larvae

Do caddisfly larvae actively select coloured case-building materials in relation to background colour?

Main research question

Do case-building caddisfly larvae choose building materials based on colour, and do they alter material choice depending on the visual background?

Specific aims

1. Test whether larvae choose between contrastingly coloured building materials non-randomly.
2. Test whether background colour influences case-building material choice.
3. Determine whether larvae change case colour after being transplanted to a different background.
4. Evaluate whether colour selection is consistent with active colour preference or background matching.



6. Natural variation of genitalia shape of caddisflies

Computer-vision-based analysis of natural genitalia shape variation within a caddisfly species

Main research question

How variable are male and female genitalia characters within a single caddisfly species, and can computer vision or geometric morphometrics quantify that variation reliably?

Specific aims

1. Image male and female genitalia of one target caddisfly species.
2. Extract taxonomically relevant shape information using computer vision and/or geometric morphometrics.
3. Quantify within-species variation in genitalia shape.
4. Assess whether variation is associated with sex, body size, population, geography or measurement error.
5. Evaluate implications for species identification and taxonomy.

7. Life cycle of alpine mayflies based on existing samples

Reconstructing the life cycle and voltinism of alpine mayflies using larval morphology from existing samples

Main research question

Which developmental cohorts and voltinism patterns co-exist in alpine mayfly populations?

Specific aims

1. Measure morphological traits of mayfly larvae from existing seasonal samples.

2. Assign individuals to developmental stages based on size and morphology.
3. Identify whether distinct cohorts are present through time.
4. Determine whether the species shows univoltine, bivoltine or semivoltine development.
5. Relate observed cohort structure to alpine environmental seasonality.

8. Representativeness of benthic invertebrate samples in leaf-litter bags compared with background stream communities

How representative are leaf-litter-bag samples of benthic invertebrate communities across gradients of stream size and elevation?

Main research question

To what extent do benthic invertebrate communities colonizing leaf-litter bags represent the surrounding background benthic community?

Specific aims

1. Compare the taxonomic composition, abundance and biomass of communities colonizing leaf-litter bags with those found in the surrounding background benthic community.
2. Determine whether leaf-litter bags provide a representative sample of the overall benthic invertebrate community.
3. Evaluate whether similarity between leaf-bag communities and background communities changes along a stream-size and elevational gradient.

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Intrigued?

Good!

Reach out to us:

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[Comment1]needs more AI
slop

[Re: Comment1]done

