



INSTITUTIONEN FÖR BIOLOGI
OCH MILJÖVETENSKAP

Masters' presentations in biology

Monday March 24, 2025

Schedule & abstracts

Time and place: 10.15-12 at Marelden (2125), Natrium

The presentations can also be followed via [Zoom](#)

- 10.15 **Lucie Röttgers** (Biodiversity and systematics, 60 hp)
Species diversity and phylogenetic relationships of parasitoid wasps in the genus *Tamarixia* (Chalcidoidea: Eulophidae)
Opponent: Laila Jan
- Ca. 11.15 **Laila Jan** (Physiology and cell biology, 30 hp)
Heart matters – Cardiac deformities impair cardiac and metabolic performance in rainbow trout (*Oncorhynchus mykiss*)
Opponent: Lucie Röttgers

Welcome!



Abstracts

Species diversity and phylogenetic relationships of parasitoid wasps in the genus *Tamarixia* (Chalcidoidea: Eulophidae)

Lucie F. Röttgers (Biodiversity and systematics (Nabis) BIO707, 60 hp)

Supervisors: Søren Faurby, Biological and Environmental Science, University of Gothenburg, Niklas Wahlberg, Department of Biology, Lund University and Emma Kärrnäs, Department of Biology, Lund University

Examiner: Bengt Oxelman

Parasitoid wasps, a specious-rich group within the insect order Hymenoptera, play a crucial role in ecosystems worldwide and serve as valuable biological pest control agents. However, despite their importance, their biodiversity remains largely undiscovered. There is a significant discrepancy between the number of described species and estimations of the true diversity of parasitoid wasps found across the world. The main objective of this study is to enhance our understanding of parasitoid wasps by investigating the species richness of the parasitoid wasp genus *Tamarixia* (Chalcidoidea: Eulophidae) in Sweden and by exploring its evolutionary history. Consequently, a combination of morphological analyses and DNA barcoding with the incorporation of four species delimitation methods (ABGD, ASAP, GMYC, mPTP), alongside whole-genome sequencing for phylogenetic inference, were employed. The analysis of 74 specimens revealed the presence of at least three potentially new *Tamarixia* species previously unknown to science. Additionally, the very first phylogenetic trees were inferred for the genus, confirming the monophyly of the genus and offering novel insights into the evolutionary relationship of eight taxa. These findings highlight the undiscovered diversity of parasitoid wasps and emphasize the need for further taxonomic and phylogenetic research on this group.

Heart matters – Cardiac deformities impair cardiac and metabolic performance in rainbow trout (*Oncorhynchus mykiss*)

Laila Jan (Physiology and cell biology, 30 hp)

Supervisor: Andreas Ekström, Biological and Environmental Science, University of Gothenburg

Examiner: Fredrik Jutfelt

In aquaculture farming of salmonid fish, the rearing environment during early life-stages determines the fish's future performance. Indeed, intense rearing conditions that promote growth rate and productivity have been linked to high mortality rates of salmonids following stressful events and therefore constitute an animal welfare challenge. The high mortality rates have been linked to the development of cardiac deformities, such as rounded ventricles and a misaligned cardiac outflow tract, the *bulbus arteriosus*, yet its impacts on cardiac and metabolic performance traits are unknown. I aimed to determine how intense rearing conditions impacts the growth rate and the development of cardiac deformities in a warm and a cold reared group of rainbow trout (*Oncorhynchus mykiss*) reared from fry at two temperature regimes differing by 4-10°C, and its impact on physiological performances. Trout were acclimated to a common temperature of 10°C for 4 weeks prior to experiments and were then instrumented with electrocardiogram (ECG) electrodes for assessments of heart rate. The heart rate and metabolic rate (by respirometry) were recorded before, during and after

an exhaustive chase protocol to acquire maximum values and to assess the heart rate and aerobic (metabolic) scopes. *Post-mortem* assessments of cardiac deformities were performed to determine the roundness of the ventricle and the misalignment of *bulbus arteriosus*. Warm reared fish exhibited faster growth rate and had more rounded ventricles and misaligned *bulbus arteriosus* compared to cold reared fish. These fish also exhibited higher resting and maximum heart rates, and a reduced heart rate scope, which coincided with lower metabolic performance as illustrated by reduced maximum metabolic rate and aerobic scope. My results show that warm rearing leads to cardiac deformities that compromise cardiac and metabolic capacities, which likely reduce overall stress tolerance and could contribute to explain the high mortality rates seen in salmonid aquaculture.

Key words: Rainbow trout, fish welfare, cardiac deformities, bulbus arteriosus, respirometry, aerobic scope, electrocardiogram.
