GÖTEBORGS UNIVERSITET

INSTITUTIONEN FÖR BIOLOGI
OCH MILJÖVETENSKAP

Masters' presentations in biology

Friday January 10, 2025

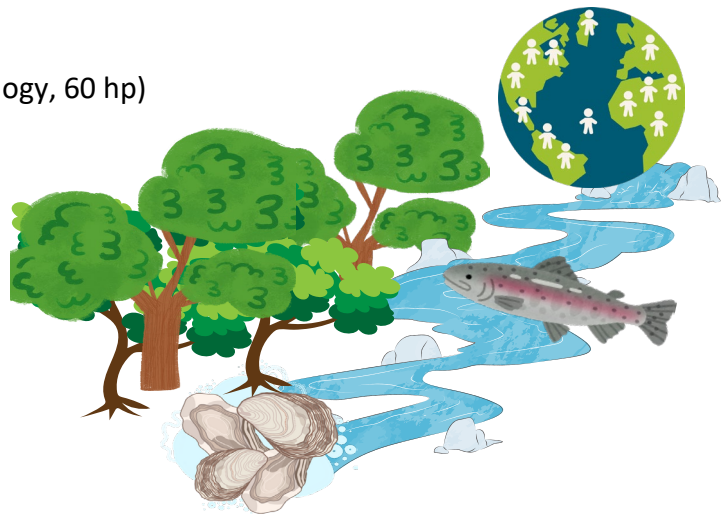
Schedule & abstracts

Time and place: 9-14 at Marelden (2125), Natrium

Times below are approximate. The presentations can also be followed via Zoom

9.00	**Carl Svensson** (Evolutionary and behavioural ecology, 60 hp) Allometric models for aboveground biomass in small and multi-stemmed tree in Rwanda *Opponent: Ida Vartia*
Coffee break ca. 10.00	
10.20	**Ella Köster** (Evolutionary and behavioural ecology, 30 hp) The population crisis in sub-Saharan Africa: Biodiversity threats and Swedish foreign aid perceptions *Opponent: Carl Svensson*
11.15	**Lore van Acker** (Conservation biology, 30 hp) Dynamics in brood chamber pH of the European flat oyster (*Ostrea edulis*) in response to ocean acidification *Opponent: Ella Köster*
Lunch break ca. 12	
13.00	**Ida Vartia** (Conservation biology, 60 hp) Title TBA *Opponent: Lore van Acker*

Welcome!



Abstracts

Allometric models for aboveground biomass in small and multi-stemmed tree in Rwanda

Carl Svensson (Evolutionary and behavioural ecology, 60 hp)

Supervisor: Göran Wallin, Department of Biological and Environmental Sciences, GU
Examiner: Håkan Pleijel

Estimates of aboveground biomass (AGB) of trees are crucial for understanding how forest ecosystems influence the global carbon cycle and tropical forests are of particular importance. Allometric equations are used to estimate AGB but the allometric relationship differs between sites, species and size of the trees. Most developed equations focus on large trees with one dominate stem. This study focuses on estimating AGB in a population of small and multi-stemmed trees at experimental sites in Rwanda, studying tree response to climate. It aims to test the validity of available equations developed for larger trees and to develop new equations for accurate AGB estimates. Additional measurements of multiple stem diameter, stem count and crown area are tested. 83 trees of 8 species were harvested and AGB was measured. The samples' diameter at breast height ranged from 1.6-13.4 cm and 16 samples had multiple stems. Wood density, height, all diameters at 1.3 m and 0.3 meter above ground and crown area was measured. AGB was compared to the estimates of several available equations. New equations were developed though regression analysis. The results show that a commonly used equation also is valid for the smaller trees of this study. This equation performed almost as good as the model developed in this study, using the same variables. Moreover, the equation, as well as the simplest equation of this study, is biased regarding trees with different number of stems. Additional measurements of multiple stem diameter or two measurements of the main stem, at different heights, as well as a stem count largely improves the estimates, in particular for multi-stemmed samples. Crown area also improves the estimates. New site- and species-specific equations are presented in this study.

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The population crisis in sub-Saharan Africa: Biodiversity threats and Swedish foreign aid perceptions

Ella Köster (Evolutionary and behavioural ecology, 30 hp)

Supervisor: Frank Götmark, Department of Biological and Environmental Sciences, GU
Examiner: Lotta Kvarnemo

The global population crisis remains underrepresented in public discourse, despite its critical impact on biodiversity and sustainable development. Population growth intensifies environmental challenges such as habitat loss, exploitation of resources, and greenhouse gas emissions. This thesis examines 1) the relationship between human population density and the threat to wild species in countries in Sub-Saharan Africa, nearly all of which face high population growth, and 2) public support to family planning in international aid to Africa in a donor country, Sweden. Correlation analyses with data from the IUCN Red List and population metrics from the World Bank, show a positive association between human population density and species threats across the following taxonomic groups: all assessed vulnerable, endangered, and critically endangered species Animalia, Plantae, Primates and birds combined, and primates and birds separately. Equatorial Guinea (EG) and The Gambia, deviate

from the trend in the graph including all assessed species (vulnerable, endangered, and critically endangered), making them the focal point of discussion. In EG, primates and plants are particularly threatened, while The Gambia mainly experiences threats to birds, both based on the measure species threat density (STD). In a survey among 1,333 Swedes they ranked foreign aid alternatives to Africa. 42% chose democracy and human rights as the highest priority, 41% chose humanitarian aid, 12% chose family planning (FP), while only 5.5% chose trade and business. There were no significant differences in rankings across gender, age, or geographic region; however, respondents with lower education levels were more likely to prioritize FP compared to those with higher education. Despite no or little information about FP, Swedes recognized its importance in reducing population growth in Africa. Human population dynamics need to be part of public discourse and policies.

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Dynamics in brood chamber pH of the European flat oyster (*Ostrea edulis*) in response to ocean acidification

Lore Van Acker (Conservation biology, 30 hp)

Supervisors: Pierre de Wit, Department of Biological and Environmental Sciences, GU, Matthew W. Gray, Center for Environmental Science, University of Maryland, & Hugo Gante Department of Biology, KU Leuven
Examiner: Karin Hårding

Ocean acidification is posing a threat to marine bivalve species who struggle to deposit calcium carbonate in order to grow their shell. Some oyster species have developed a brooding reproductive strategy which might help them cope with this acidification stress. Brooding oysters have shown to be more resilient against ocean acidification than broadcast spawning oyster species. It is suspected that because the brood chamber is on top of the maternal gills, the mothers add carbon dioxide into the chamber from her respiration. This suggests larvae evolved to develop in a more acidic environment than the surrounding water column. Through exaptation the larvae may have coopted traits needed for development in the brood chamber which now enable them to be more resilient to ocean acidification. In this study, we measured the pH inside the brood chamber of Ostrea edulis under current and future predicted ocean conditions (i.e., elevated temperature and decreased seawater pH) to get a better understanding of the ambient-maternal relationship on brood chamber pH fluctuations under ocean acidification scenarios. The results suggested that maternal respiration indeed makes the brood chamber always a more acidified environment then the surrounding water. Elevated temperatures in the surrounding water slightly lower the pH as a result of increased maternal metabolism. Yet lowering the ambient pH causes a much larger and significant reduction of internal pH levels since the oyster is constantly filtering the overlaying water while the valves open. Additionally, there seems to be a positive relationship between shell gape and internal pH changes suggesting that the mother's behaviour may also influence how fast and to which level pH values can drop inside the brood chamber. These results give an indication of what conditions brooding oysters larvae will have to face in the future and helps determine possible winners and beneficial strategies in an acidified ocean.

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Title TBA

Ida Vartia (Conservation biology, 60 hp)

Supervisor: & Johan Höjesjö, Department of B iological and Environmental Sciences, GU
Examiner: Pierre de Wit

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