



INSTITUTIONEN FÖR BIOLOGI
OCH MILJÖVETENSKAP

Masters presentations in biology

March 2021

Schedule & abstracts

Thursday March 18

ZOOM

- Ca.13.30 **Tala Mohimani** (Biodiversity & systematics, 30 hp)
Tragic destiny: Present and future diversity of scavenging birds
Opponent: Mary Ballard-Johansson
- Ca. 14.15 *Break*
- 14.30 **Ellinor Delin** (Conservation biology, 60 hp)
Understory species composition after a forest fire
Opponent: Mikael Helander
- 15.30 **Mary Ballard-Johansson** (Conservation biology, 60 hp)
Green toad gone: The past and future of the European green toad (*Bufo viridis*) in Sweden
Opponent: Tala Mohimani

Welcome!



Abstracts

Tragic destiny: Present and future diversity of scavenging birds

Tala Mohimani (Biodiversity & systematics, 30 hp)

Supervisors: Sören Faurby, Biological & Environmental sciences, GU & Robert Cooke

Examiner: Bengt Oxelman

Scavenging birds have a large role in controlling and regulating services by evacuating and consuming carcasses of dead animals. Their populations have been through many dangers. Large mammal extinction is one of the biggest threats for different scavenging populations. Predictors such as human footprint, precipitation, elevation, and large mammals' populations and extinction rate can cause fluctuation in scavengers' populations and scavenging rate all around the world. "Effective scavenging richness" is the metric to report the level of scavenging each one of the birds does. Also, large mammals are going down the lane of extinction very quickly. I calculated the current and future distribution for both large mammals and scavenging populations. The current situation of birds shows that in Africa and the Indian subcontinent there are more obligate scavenging birds, while other places have higher distributions of facultative scavengers. Both scavenging birds and large mammals' extinction rate have been calculated before. Here I used those predictions to create range maps to see if in the future some large mammals go to extinction, what will happen to scavenging birds. Creating range maps and conducting multiple regression analyses supported the hypothesis; the strongest extinction driver for scavenging birds is large mammal extinction, but human footprint is also a great threat.

Key words: scavenging birds, large mammals, extinction, future prediction

Understory species composition after a forest fire

Ellinor Delin (Conservation biology, 60 hp)

Supervisors: Anne Bjorkman, Biological & Environmental sciences, GU & Peter Ståhl,

Länsstyrelsen Gävleborg

Examiner: Karin Hårding

Fires are important disturbances that shape the structure and composition of boreal forests. The plant species composition after a fire has a large impact on the character of the future forest. One important factor deciding which plant species grow after a fire is the depth of the burn into the soil. Shallow burns, where most of the organic soil layer remains, allow some underground plant parts to survive and resprout after fire. Where the burn is deep enough to kill the understory, but not so deep as to destroy the seed bank, seeds from the seed bank can germinate. Finally, where the burn is deep enough to expose the mineral soil, newly dispersed seeds can establish. I investigated the effect of the presence or absence of an organic layer on understory species composition two years after a forest fire. The study was conducted in a boreal forest in Hälsingland. The vegetation was generally sparse. Bryophytes and wind-dispersed tree-seedlings were more common on exposed mineral soil. The dwarf shrubs *Vaccinium vitis-idaea* and *Vaccinium myrtillus*, which can resprout from underground tissues after fire, were much more common on patches with a remaining organic layer. Microclimatic and soil factors were also measured in a selection of the plots to investigate their effect on the species composition. However, since the vegetation was sparse, and the number of plots

with the full set of data was small, it was hard to draw any conclusions about this. My results concur with earlier research. The depth of burn seems to have an important impact on the post-fire understory species composition. Further studies with a larger data set would be needed to reach conclusions of the impact of other environmental factors on the understory species composition.

Green toad gone: The past and future of the European green toad (*Bufo viridis*) in Sweden

Mary Ballard-Johansson (Conservation biology, 60 hp)

Supervisors: Sören Faurby, Biological and Environmental Sciences, GU, Ewa Wikberg, Zoology Department, Nordens Ark & Mats Niklasson, Research Department, Nordens Ark

Examiner: Mats Olsson

Why is the European green toad (*Bufo viridis*) threatened in Sweden while it thrives in other countries? Climate change, the overall shifts in temperature and weather events, is affecting species across the globe. The effects of climate change on species is a critical area of study, and the declining peripheral species, especially those on the northern edges, become increasingly important. As a species that fits those criteria, the green toad is considered the most endangered amphibian species in Sweden. Numerous sites over the past 115 years were chosen based on historical and current observations of the toads. This study uses the available climate data from the University of East Anglia CRU TS (Climatic Research Unit gridded Time Series) to determine if these factors negatively impact *B. viridis*. A species distribution model was created and used to establish the suitability of the sites based on both current climate conditions and the climate conditions from the earliest time period. The resulting differences of means indicated that climate has affected the sites, lowering the suitability over the last 100 years. However, when comparing the sites from the earliest time period, using the current climate data, that currently have a toad population with those that no longer sustain the species, the differences were minimal. There appears to be no conclusive data as to why the toads no longer exist at those sites. If climate change is the cause, reintroduction into increasingly uninhabitable areas becomes a pointless endeavor. By ruling out the effects of climate change, we can thereby focus more closely on other causes.

Key words: European green toad, climate change, Sweden, peripheral populations
