



# Rove beetles (Coleoptera: Staphylinidae) and similarly mega-diverse insects as key models for understanding Earth biota

Alexey Solodovnikov

Natural History Museum of Denmark

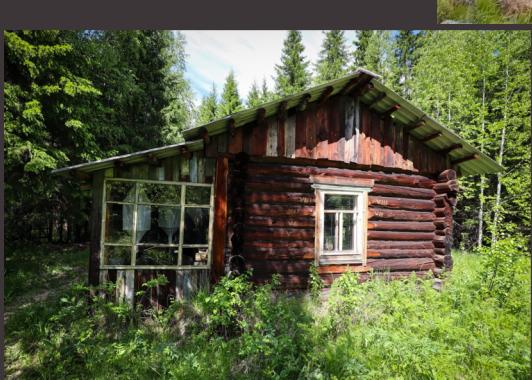


@zmuccoleoptera

asolodovnikov@smm.ku.dk



# Collecting insects

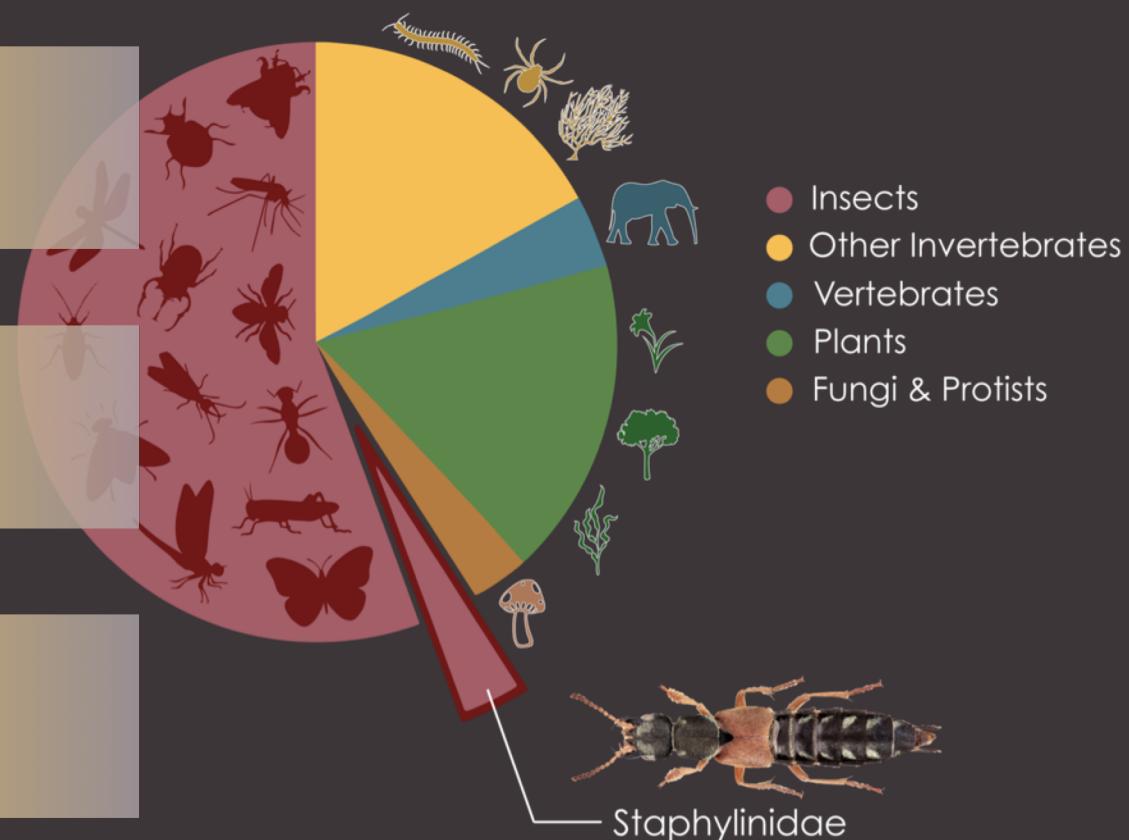


# Big chunk of biodiversity and a great proxy

Evolution of Life

Life and environment

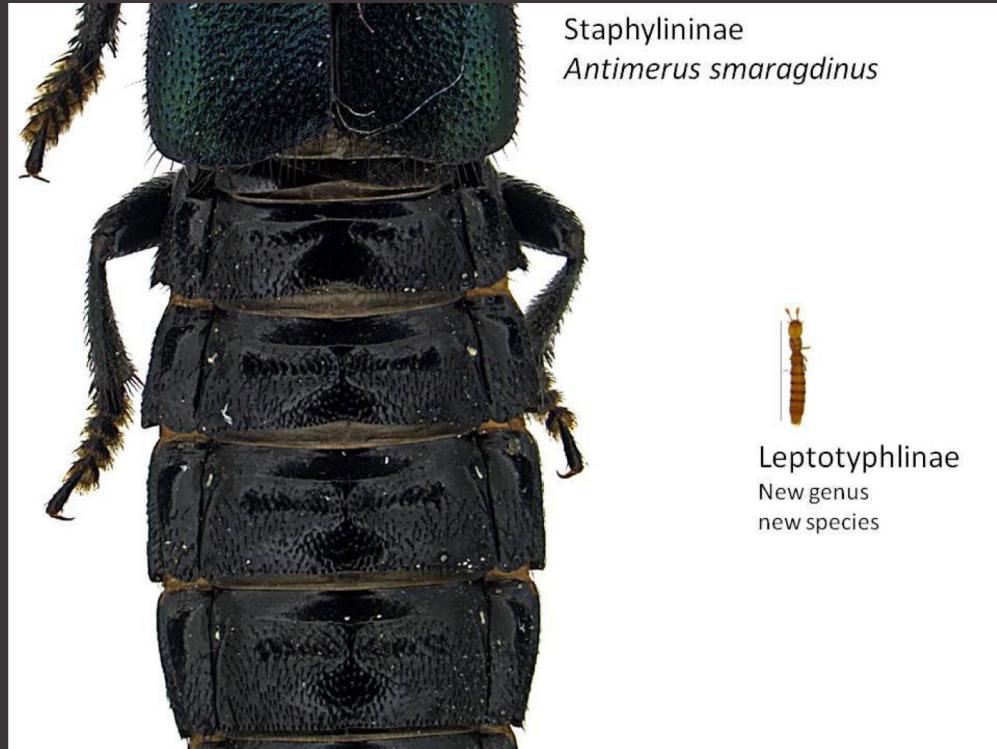
Biotic interactions



# Rove beetles (Staphylinidae), ca. 70,000 described species



D<sub>3</sub> DESIGNS  
DKB DIGITAL DESIGNS



Staphylininae  
*Antimerus smaragdinus*

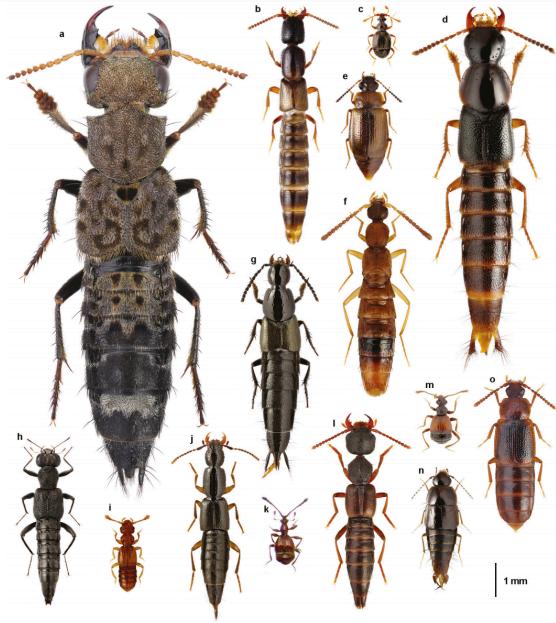


Leptotyphlinae  
New genus  
new species

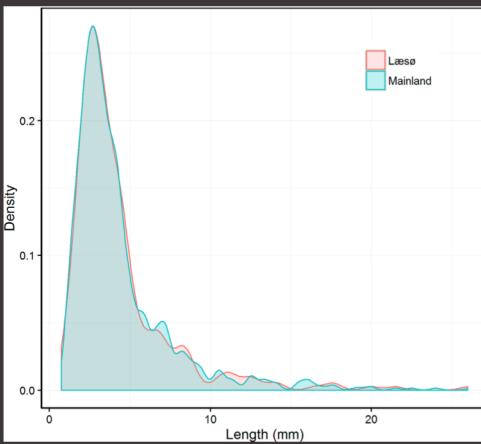
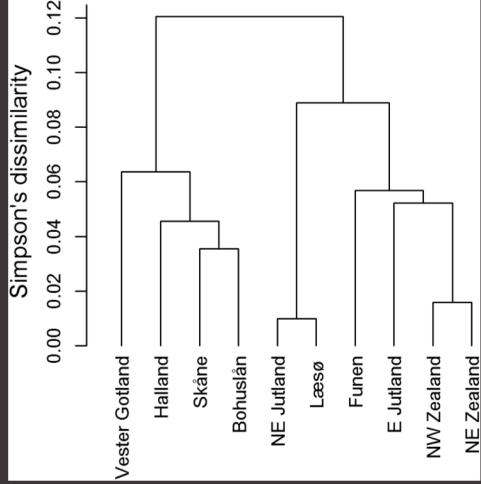
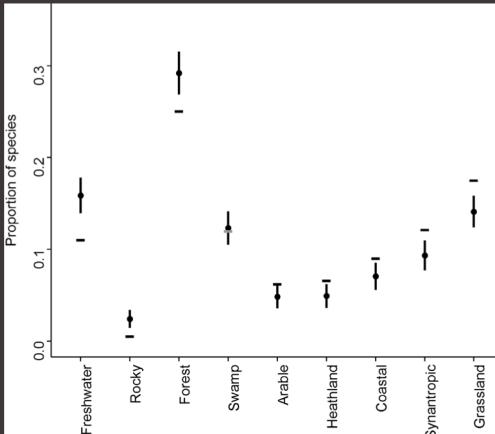
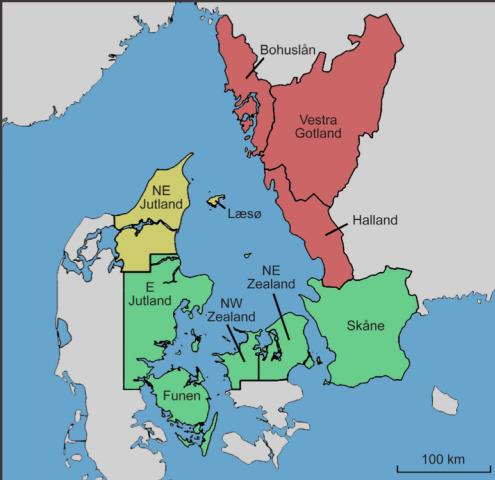


From Nick Porch @InvertoPhiles

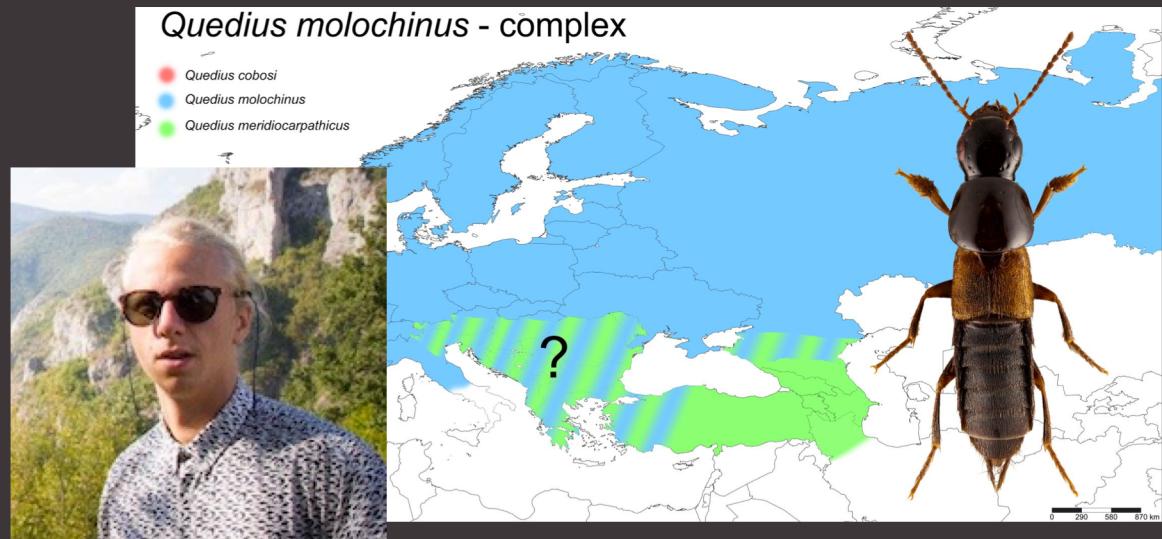
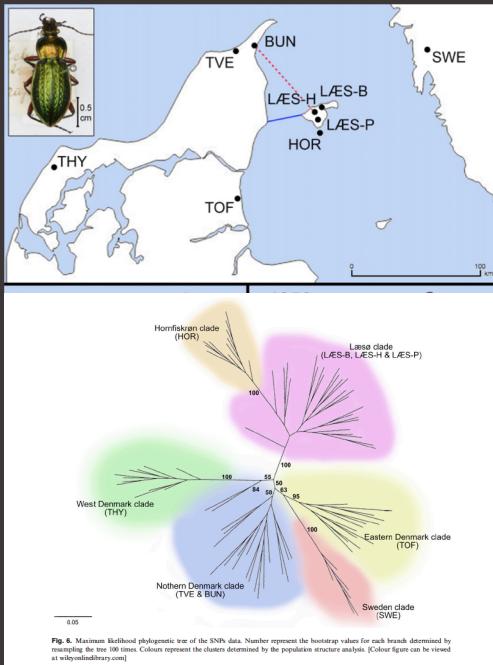
# Patterns of Danish nature: ecofaunistics



Hansen et al. 2018  
DOI: [10.14411/eje.2018.025](https://doi.org/10.14411/eje.2018.025)



# Patterns of Danish nature: population genetics and phylogeography



Aslak Kappel Hansen

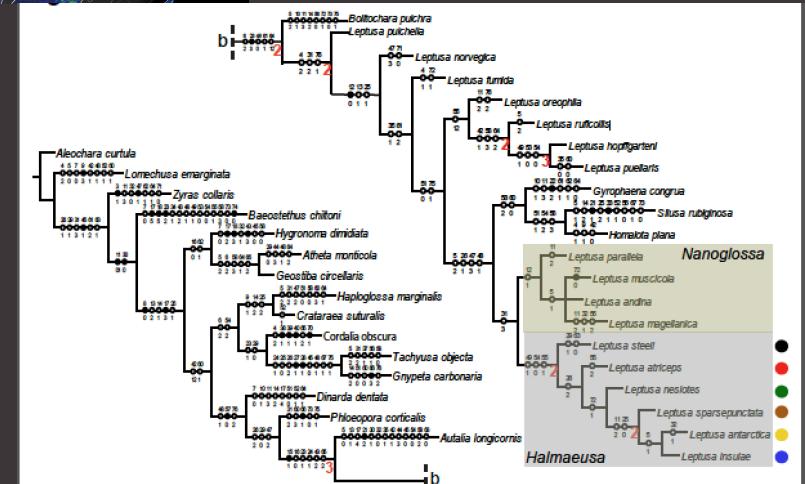
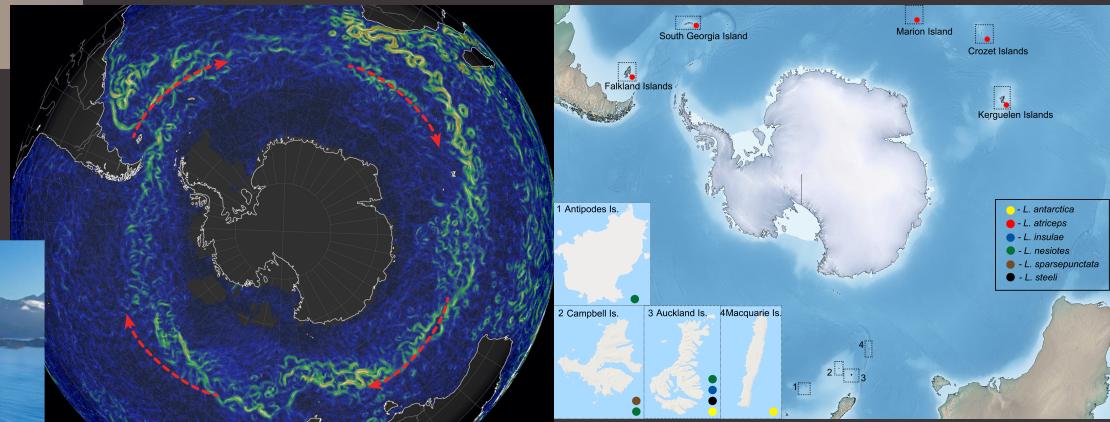
Hansen et al. 2018

<https://onlinelibrary.wiley.com/doi/abs/10.1111/icad.12268>

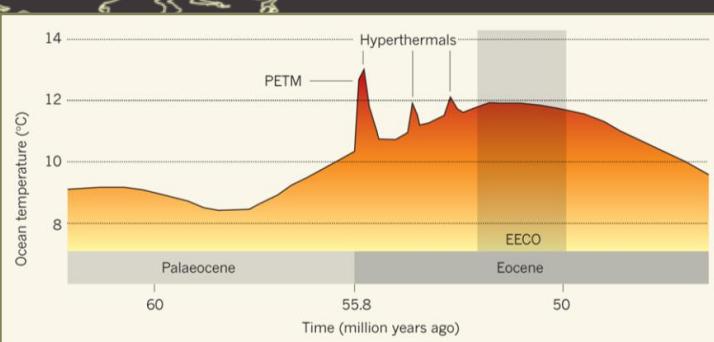
# Nature of Subantarctic islands



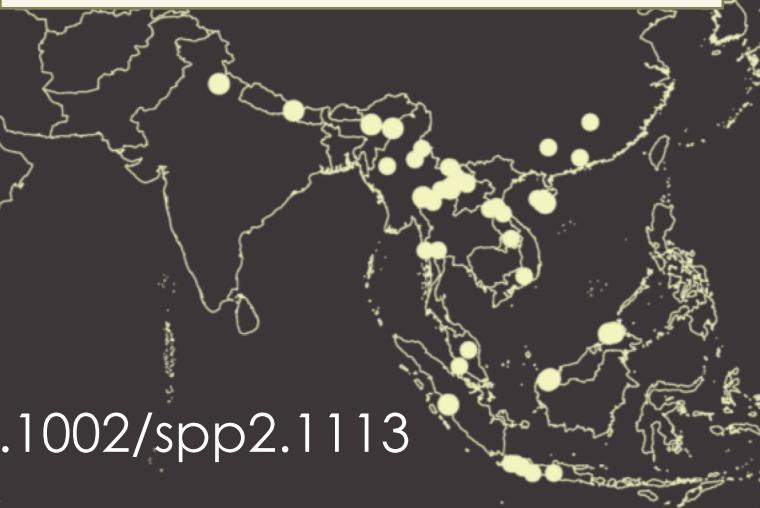
Igor Orlov



# Eocene 'hothouse' climate

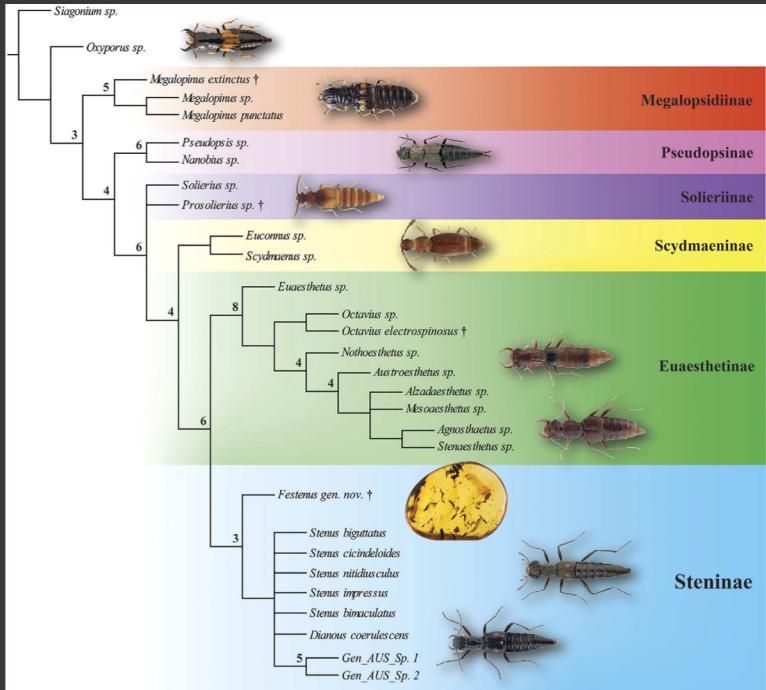


Amalia Bogri



Bogri et al. 2018 <https://doi.org/10.1002/spp.21113>

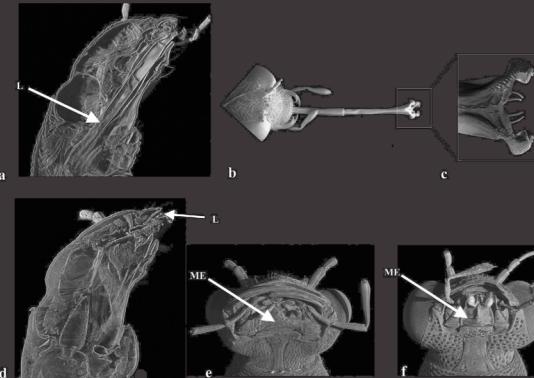
# Cretaceous biota

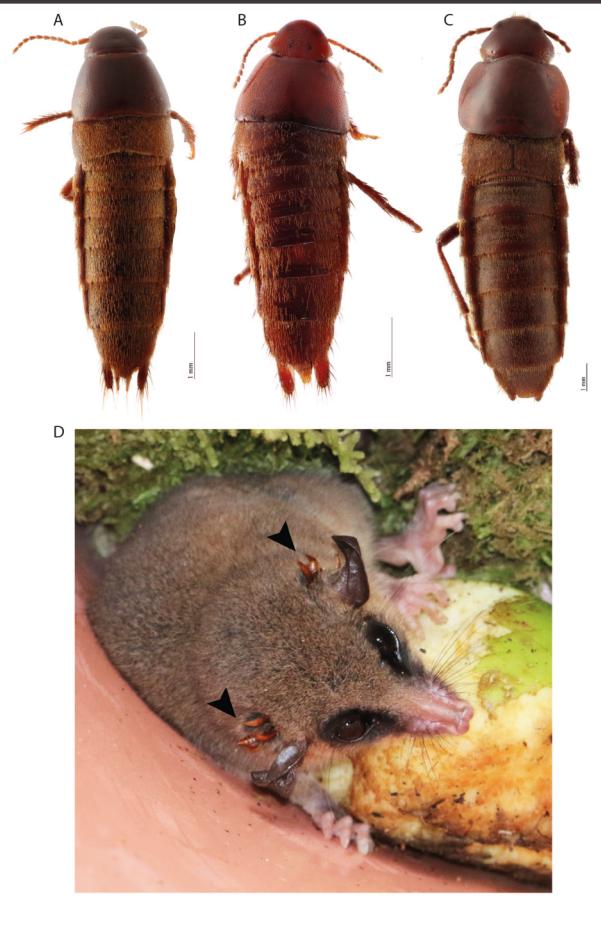


Żyła et al. 2017  
<https://www.nature.com/articles/srep45904>

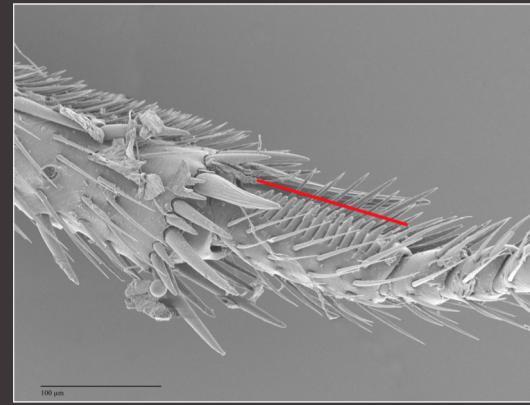


Dagmara Żyla





## Unique symbiosis



Solodovnikov & Jenkins Shaw 2017 <https://doi.org/10.1111/aen.12233>

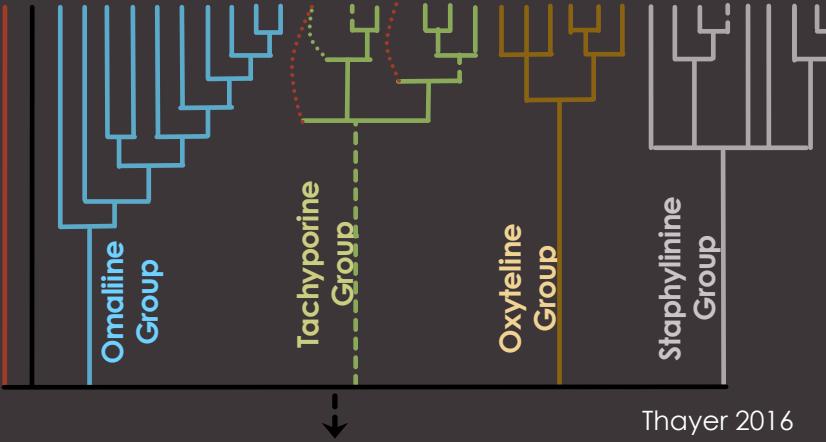
## Populations and species

Scydmaenidae  
Silphidae  
Glyphoholomatinae  
Empelinae  
Omaliiinae  
Microsilphinae  
Proteininae  
Micropeplinae  
Neophoniinae  
Dasycerinae  
Protoselaphinae  
Selaphinae  
  
Tachyporinae pars  
Phoeocharinae  
Olisthicerinae  
Tachyporinae pars  
Trichophyinae  
Habrocerinae  
Aleocharinae  
Trigonurinae  
Apteticinae  
Scaphidiinae  
Plestinae  
Osorinae  
Oxytelinae  
Oxyporinae  
Megalopsidiinae  
Steninae  
Eugasthetinae  
Solerinae  
Leptophiliinae  
Pseudopsinae  
Staphylininae  
Paederinae



## Genera and tribes

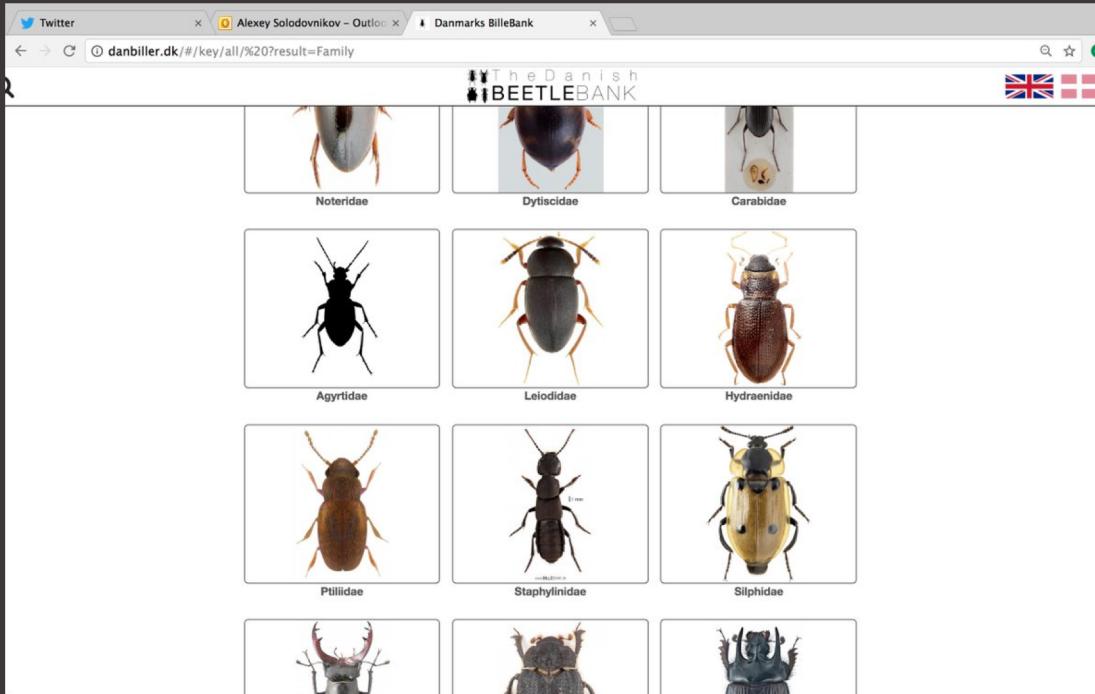
## Subfamilies & families: deep splits



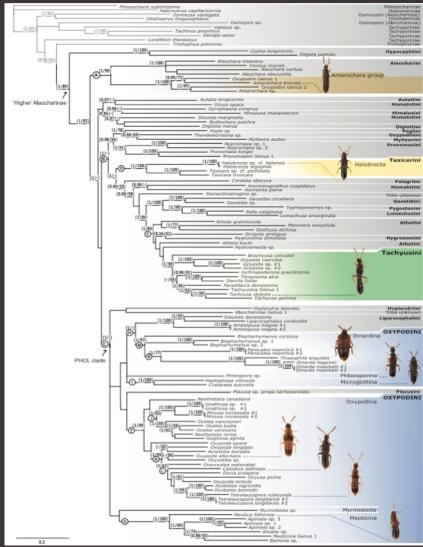
Thayer 2016

## Phylogenetic systematics: key to become a model

# Aslak Kappel Hansen: Danish beetle bank



# Igor Orlov: Integrated phylogeny of Aleocharinae



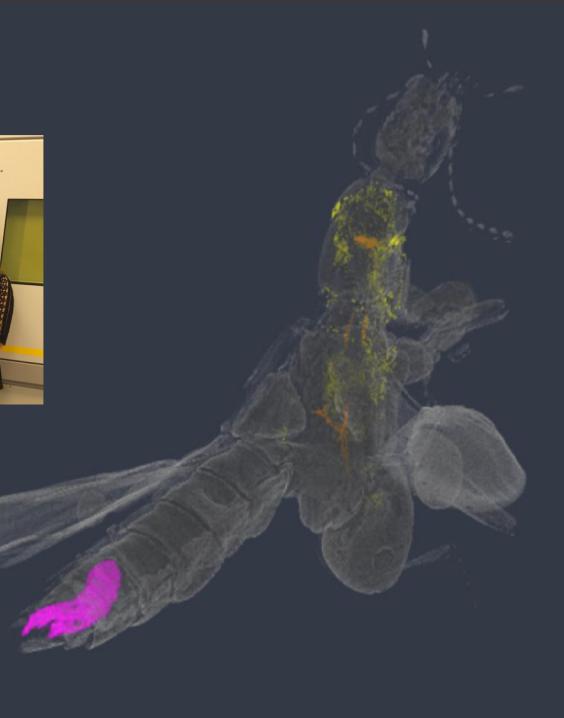
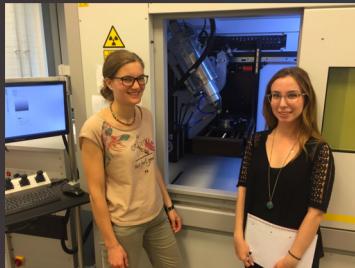
# In progress



# Amalia Bogri: Paederinae and Eocene hothouse climate



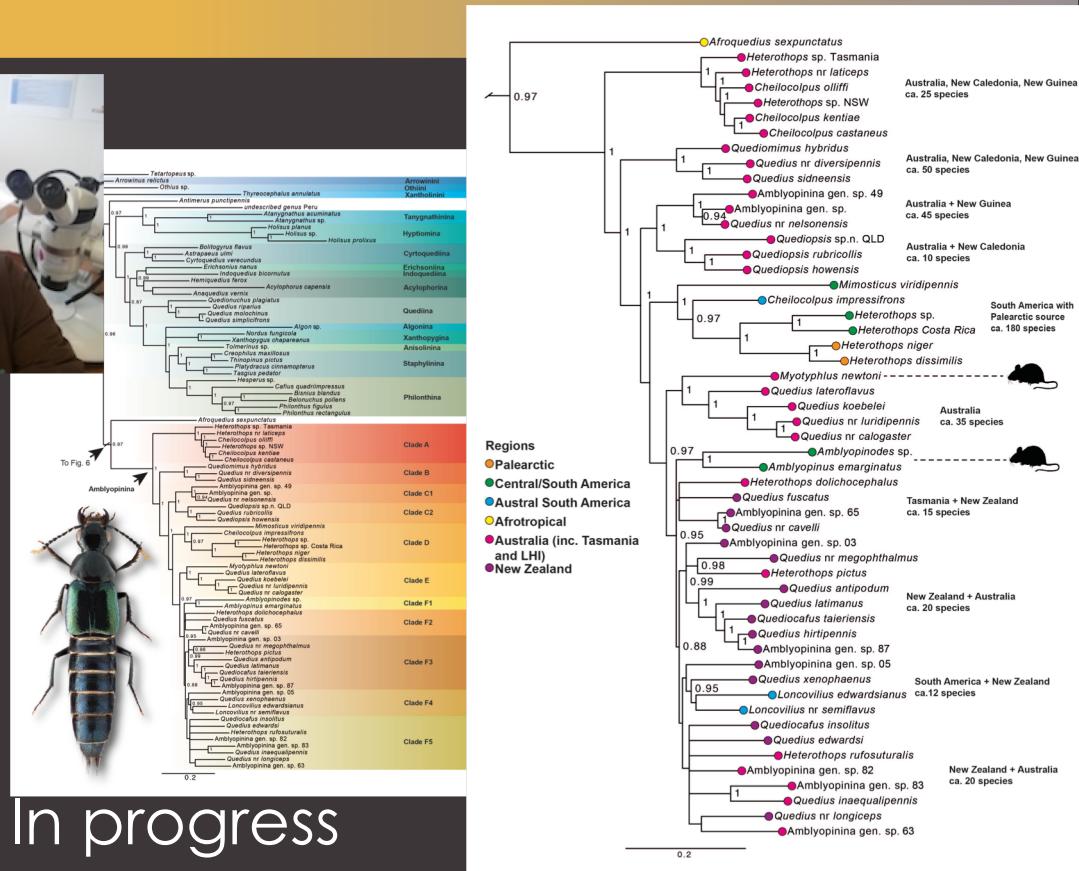
In progress



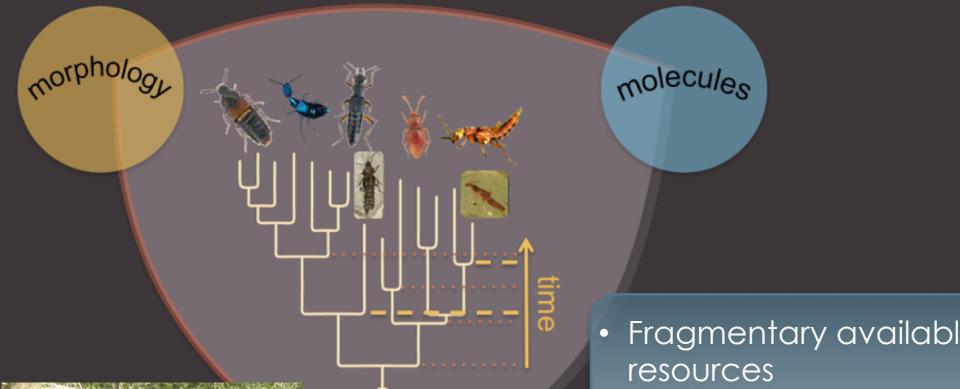
Kypke and Solodovnikov 2018

<https://www.tandfonline.com/doi/full/10.1080/08912963.2018.1558222>

## **Josh Jenkins Shaw: Amblyopinina phylogeny and generic revision**

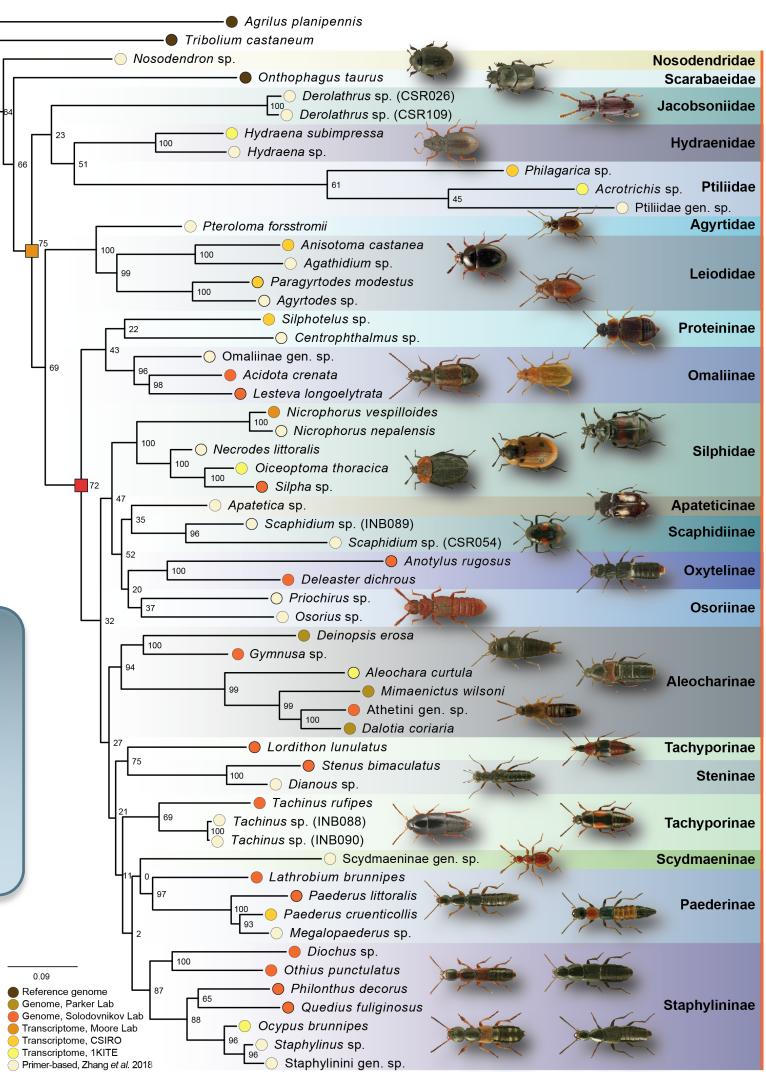


# Janina Kypke: the backbone phylogeny



- Fragmentary available genomic resources
- Shotgun sequencing of new samples
- Mining for orthologous genes
- Analysis

In progress





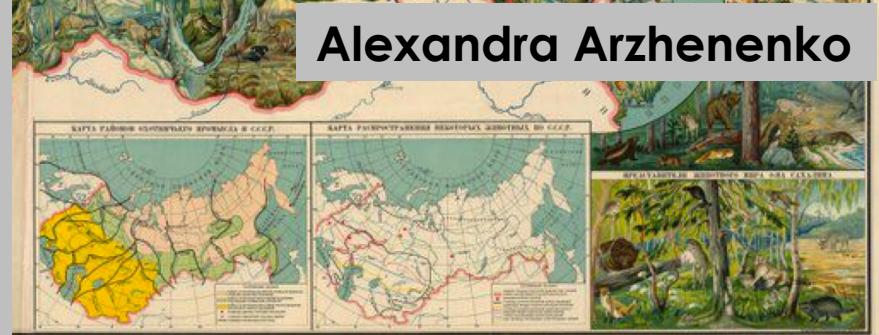
**Maria Salnitska**  
Salnitska & Solodovnikov 2019

.....  
**Salnitska & Solodovnikov 2018**  
[https://biotaxa.org/Zootaxa/article/  
view/zootaxa.4394.1.5](https://biotaxa.org/Zootaxa/article/view/zootaxa.4394.1.5)  
**Salnitska & Solodovnikov 2018**  
[http://www.europeanjournaloftaxonomy.eu/  
index.php/ejt/article/view/529/0](http://www.europeanjournaloftaxonomy.eu/index.php/ejt/article/view/529/0)

**Salnitska & Solodovnikov 2018**  
<https://dez.pensoft.net/article/27033/>



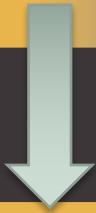
**Alexandra Arzhenenko**





Pinned  
collection

Fossils



Need for  
modern  
collections



Tissue  
collection



Wet  
collection



# TAK!!!

The screenshot shows a Mac OS X desktop with a yellow-to-white gradient background. An open Safari browser window displays the Solodovnikov Lab website. The page title is "Solodovnikov Lab" and the subtitle is "systematics tells the story of biodiversity where beetles are the biggest chapter". Below the title is a navigation menu with links: HOME (highlighted in blue), PEOPLE, PROJECTS, PUBLICATIONS, PHOTOS, JOIN US, and CALENDAR. Under the menu, there are five small images: four beetles of different species and a tray of pinned specimens. A sidebar on the right shows a tweet from @zmuccoleoptera: "The crew at Tropic, Slovenia. We finally got a view of the area after 5 days of clouds. Magnificent place!" with a photo of a mountainous landscape. The Mac OS X dock at the bottom contains icons for various applications like Finder, Mail, and Safari.

## Various funding sources:

**Horizon2020, Carlsberg Foundation,  
Russian Science Foundation, Villum  
Foundation, AVJensen Foundation,  
etc.**

