

**DOCTORAL CANDIDATE:** Olja Toljagić  
**DEGREE:** Philosophiae Doctor  
**FACULTY:** Faculty of Mathematics and Natural Sciences  
**DEPARTMENT:** Department of Biosciences, Centre for Ecological and Evolutionary Synthesis  
**AREA OF EXPERTISE:** Evolutionary biology and Paleobiology  
**SUPERVISORS:** T.F. Hansen, L.H. Liow, K.L. Voje, M. Fortelius  
**DATE OF DISPUTATION:** 6<sup>th</sup> of July 2018

**DISSERTATION TITLE:** *Macroevolution with a bite: Teeth evolution and diversification in ruminants*

The astonishing diversity of life we see around us is shaped by the interactions between organisms and the environment. How this happen over long time has been a lasting interest of evolutionary biology, and is even more so important in today's changing world.

With her doctoral work, Olja Toljagić has focused on explaining how the spread of grasslands and adaptations to eating grass have impacted the evolution of ruminating mammals. Toljagić and colleagues show that it takes millions of years for ruminants to adapt properly to new diets and habitats, by developing high-crowned teeth. These findings are highlighting the previously unknown slow of evolution of ruminants, which could be of importance when predicting the future of the group. They also find that new evidence that these new adaptations helped ruminants leave more descendants and become one of the most widespread groups of large mammals they are today. By developing a new system to examine tooth morphologies in ruminant fossils, Toljagić shows that, seemingly, even though the teeth adaptation took millions of years, there were early signs of it in the history of this group. So even though it can take time to reach the goal, the wheels of evolution are set in motion early on.

Today grasslands cover up around 40% of the Earth's land surface and affect both climate and grass-eating animals. By combining modern molecular and statistical methods with the examination of fossils, Toljagić sheds new light on a classic story of ruminant adaptation to these important habitats.