



České Budějovice, 12 June 2023

Purpose:

PhD defense of Samuel Dijoux
Faculty of Science
University of South Bohemia
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Report of the supervisor of the PhD dissertation

Samuel joined our group as an undergraduate intern in 2015 to develop his skills in modelling ecological processes. During his stay, he developed an interest in size-structured population models, and started working on what seemed at the time to be a relatively straightforward extension of a classic paper by Andre de Roos and Lennart Persson on the collapse of top predator populations in size-structured food webs. His Master's thesis showed great potential for further development, and I offered Samuel the opportunity to continue working on these models as part of a PhD thesis.

A few years later, it turned out that the modelling task was much more difficult than we first thought during his internship. Nevertheless, the enormous amount of work, perspiration and frequent periods of despair eventually paid off. Samuel's extensive modelling led to a rigorous analysis of the mechanisms that hold multi-channel food webs together and the discovery of several qualitatively new emergent Allee effects. The results were published in Ecology Letters in 2021. I take full responsibility for the delays in writing this first paper when I was distracted for extended periods by family problems. Further delays occurred as we were polishing the analyses and text back and forth in multiple versions of the manuscript. It was sometimes difficult to share the notion that a great paper needs time to mature. I hope Samuel now sees the value of it: the publication earned him the 1st prize in the global Brian Moss Student Competition organized by the International Society of Limnology (SIL) and a plenary talk in front of an international audience at the SIL conference in Berlin in 2022.

Looking back, working on the first study was the perfect springboard for Samuel to work on another modelling study that became even more extensive. This study on the effects of invasion along multiple gradients of environmental conditions and community size structure also took a long time to mature, but again was worth the effort as the manuscript is currently invited for resubmission in Ecology Letters. It is by far the most comprehensive modelling study I have ever been involved in, and could easily be split into several smaller papers.



This left Samuel relatively little time to add a third paper to his dissertation. Although he has several other ideas in the pipeline, he decided to develop a model inspired by his internship with Raul Primicerio at the Arctic University in Tromsø. This last chapter was developed in a short time almost entirely by Samuel alone, and I was much less involved. This proves that Samuel has learned a lot about modelling and asking relevant ecological questions during his PhD and is ready to work on his own.

Samuel is also a long-distance runner. I am excited to seeing him in the home stretch of this particular race, which has taken longer than either of us expected. I am grateful that Samuel persevered and I look forward to continue to work on our joint projects beyond his PhD. Although his PhD thesis consists of only three papers, they are all of excellent quality and I believe they contribute significantly to our understanding of the future changes in aquatic ecosystems in the Anthropocene. I commend Samuel for the award of the PhD on the basis of his dissertation thesis and wish him all the best for his future career.

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