

## **Supervisors notes on PhD Thesis of MSc. Lukáš Drag „Phylogeography and conservation genetics of endangered saproxylic beetles in Europe“**

It is great pleasure to have Lukáš's PhD thesis in hands. Not nearly as great as collaboration with him in the past eight years, though. After his master thesis dealing with mark-recapture of *Rosalia alpina*, it was clear that Lukáš is capable to work independently and thoroughly. After some discussions we decided his PhD will focus on little explored field of population genetics of saproxylic beetles.

The alpine longicorn *Rosalia alpina* was an obvious choice. It is rather widely known, nationally and internationally protected species. Its range covers most of the range of European broadleaf forests. At the time it was a little studied species, and we already had rather extensive experience with it. We wanted instrument delicate enough to allow for seeing not only the main phylogeographic patterns as the cytochrome c oxidase usually does, but also the likely more intricate relations among different populations. While at the time the NGS was still the big thing on distant horizon, the price of microsatellite design decreased ten fold within a few years and became affordable even to entomologists interested in less amusing organisms than *Drosophila*. Hence the marker choice was also obvious.

It certainly was cheeky and risky decision. The Ph.D. candidate and his supervisor had zero experience with molecular biology, and there were certain uncertainties about funding. To say the least. The decision was admitably more risky to the Ph.D candidate than to his supervisor. Today, you have the chance to see whether or not Lukáš succeeded in this task.

Lukáš started his Ph.D. with design of microsatellites for *Rosalia alpina*. At the beginning we collected samples in nearby countries such as Slovakia and Hungary. The results were rather dissapointing, as even the microsatellites failed to reveale any pattern for the sampled populations. Hence we had to move further in the next years. Eventually we traveled around Europe and Asia for several years and managed to get the material from whole range of the species. Although Lukáš collected a lot of material himself, material collecting was the main part where supervisor was of some use to the Ph.D. candidate.

Lukáš was working hard. Despite he repeatedly had to explain basics of population genetics to his supervisor, he also designed microsatellites for *Cerambyx cerdo* and *Osmoderma barnabita*. He has shown that population of the earlier species in nearby Hluboka nad Vltavou was most likely introduced after the extinction of the native one. This is the first documented reintroduction of an endangered saproxylic beetle. In the increasingly fragmented

world, reintroductions are likely to become important strategy for conserving populations of many saproxylic beetles. Together, we also prepared paper „Goodbye letter to alcohol“ based on idea of our late friend and colleague Pavel Pokluda.

Despite the above, Lukáš remained focused on his main aim. In the first paper on molecular genetics of *R. alpina* he investigated relations among populations in Central and SE Europe, including the origin of the spreading lowland populations. His works are published in appropriate journals, and despite they might not be terribly inventive in terms of methodology, they are among the first and highest standard papers dealing with population genetics of beetles.

The last chapter of the thesis is unpublished. It presents phylogeography of *R. alpina* and is among the first phylogeographies of animals associated with European temperate broadleaf forests. While the sampling and analyses of phylogeography patterns of the beetle are finished, the text is not in its definitive form. The chapter was incorporated to the thesis mainly with the hope of constructive discussion with leading experts that would help to carve its final form for publication.

To summarise, it was great pleasure to work with Lukáš. He introduced me to basics of molecular genetics, his work allowed me to leave office and travel interesting parts of Europe, enjoy hunting for – from the entomological perspective – the big game, and, perhaps, get some understanding of the beetle and its habitat. Lukáš was great and patient teacher. In the meantime, he managed to master all steps of his work from design of microsatellites to the lab work, various analyses of gained data and careful interpretation of resulting patterns. Results of his work enable us and other researchers to analyse population structure of important protected beetles, and Lukáš is becoming a leading expert on population ecology of saproxylic beetles.



Lukáš Čížek

In České Budějovice, 9<sup>th</sup> October 2016