

## Supervisor's evaluation of the PhD thesis of

Terezie Rychtecká (Stachová):

### **Biodiversity—functioning studies in grasslands: their design, analysis and the importance of realized diversity**

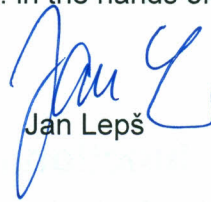
The thesis is focused on the biodiversity – ecosystem functioning research, a topic, which is recently widely discussed in the ecological community, and although the contention between the competing groups is not so hot as it used to be some ten years ago, the discussion is still not settled.

The thesis tackles the discussion from several points of view. Most of the “hard experimental data” comes from the so called biodiversity experiments, where the diversity of experimental synthetic mixtures is experimentally manipulated (i.e., in plant ecology, mixtures of different richness are sown), and ecosystem functioning (typically, even though not fully logically plain biomass) is taken as response.

These, so called, biodiversity – ecosystem functioning (BEF) experiments generally demonstrate positive relationship between diversity and ecosystem functioning, and are often thought as an argument for biodiversity conservation. Nevertheless, there are several problems here. First, there is a question, to which extent results of these experiments can be applied to real ecosystems, particularly in view of the fact, that in temperate seminatural grasslands (which are the closest system to the one used in BEF experiments) – the biomass (represented by standing crop) and the biodiversity are often negatively correlated. One of the basic problems, in my view, lies in the fact that in real ecosystem, we work with realized diversity, which can be in BEF experiments rather different from the sown diversity. Two of the papers (one based on a modelling exercise and one on the analysis of various data sets) demonstrate that the distinction between realized diversity and sown diversity (which in nature corresponds to a type of species pool) is very important, and might contribute to the explanation of part of the biodiversity – functioning controversy. The BEF experiments have further (at least) two controversial points – one is the belief that the results are relatively independent of the sowing densities in an experiment. A simple experiment, using wide range of sowing densities clearly demonstrated that the changes in sowing density can considerably change the outcome of an experiment. And finally, the methods of the analysis were discussed many times – recently, two groups of methods are used. The fourth study thoroughly analyses the prerequisites, assumptions, drawbacks and advantages of individual methods.

In three of the papers, Tereza is the first author. She has worked very independently, she acquired all three types of skills needed for successful research in the area – mathematical modelling, experimental work and analyses of the data. I am also quite happy with her writing skills, she is able to formulate her thoughts and draw conclusions from the statistical analyses done. Consequently, I recommend the thesis for the defense, and leave the detection of all the possible drawbacks, mistakes etc. in the hands of the reviewers.

In České Budějovice, April 25, 2014



Jan Lepš