

Prof. Mgr. Ing. Jan Frouz, CSc.
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Dear Prof. Frouz,

I am writing in regard to the dissertation of Mgr. Petr Heděnc which was sent to me earlier in the summer for evaluation. The following is my report on this work.

The dissertation covers a number of research studies on the interactions between plants and soil biota, particularly focussing on the effects of the cultivation of biomass energy crops on below ground communities and ecological processes. As such, the work is highly topical and of great relevance to a wider body of current research on the relationship between land use change, biodiversity and the delivery of ecosystem services in European agricultural landscapes.

The dissertation is well written in an appropriate style and is largely free from errors. It comprises an introductory literature review, followed by four chapters presented in the form of scientific journal papers. One of these has already been published in the European Journal of Soil Biology. Of the remaining chapters, which have been submitted for publication, I consider them to be of a standard suitable for publication in international peer-reviewed journals.

I have the following questions to the defendant:

Ch. 2: What are the potential reasons for the disparity between the preferred litter type and the type supporting greatest reproduction?

Ch. 3: How might differences in pesticide or fertilizer regimes in the source fields have contributed to the observed differences in soil biota and ecological processes between different crop types?

Ch. 4: What was the rationale for using a cultural meadow as a control, rather than a conventional arable crop, especially since most effects identified in Chapter 3 can be attributed to differences in tillage and time since cultivation?

Were there differences in establishment time and agricultural inputs between the different crops sampled?

What specific biological mechanisms could explain the observed differences in the composition and abundance of soil fauna and bacterial biomass between introduced and native biomass energy crops?

Given the differences in bare ground and litter between the crop types, was a statistical approach which treated these factors as co-variables considered, in order better to identify the additional effects of native vs. introduced species?

Ch. 5: Are the observed leachate effects specific to introduced crop species? What would you have expected if your control had been leachate from a native crop species? Was this considered, rather than using deionised water as a control?

Overall: What would you consider to be the most important findings from your studies? Are there consistent patterns with regard to the impact of native or introduced biomass energy crop species on below-ground biota and soil processes?

What are the implications of your findings for farmers and policy makers? What recommendations would you make on the basis of your findings?

Overall, the work has been well executed and the dissertation demonstrates that the defendant is technically proficient in a wide range of appropriate field, laboratory and statistical techniques. The literature review and discussion show a good grasp of relevant literature and the wider context of the study. The dissertation presents work that is of a standard sufficient for publication in international peer-reviewed journals. It will usefully contribute to the body of current research on the relationship between land use change, biodiversity and the delivery of ecosystem services in European agricultural landscapes.

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