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Toruń, 07. 11. 2019

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Review of the habilitation proposition of Dr Wojciech Solarz

General remarks

Wojciech Solarz is based at the Institute of Nature Conservation of the Polish Academy of Sciences in Cracow. He received his master degree in 1995 with an ornithological study and continued his work on breeding birds in his thesis (2003) on “Demografia i behavior w populacji rokitniczki *Acrocephalus schoenobaenus* L. w dolinie Nidy” supervised by Prof. Zbigniew Witkowski. Since 1999 he is assistant professor at the mentioned Institute.

Since 2002 Dr Solarz has published 31 papers in international scientific journals indexed in Scopus. This work is accomplished by 47 additional papers in non-indexed journals. These publications received 1788 citations (without self-citations; Scopus retrieved 06.11.2019) resulting in a Hirsch index of 11. After more than 20 years in science this scientific output is average with respect to typical Polish habilitations. However, the number of citations is high compared to other habilitations. On the other side, I'm concerned about the fact that in only three of these 31 indexed publications Dr Solarz served as lead author. These three papers received only four citations so far (Scopus 06.11.2019).

I also compared the Scopus and the Google Scholar citations (3130). The respective quotient tells about the social outreach of a researcher. The current quotient of 1.78 means that Dr Solarz had nearly equal numbers of citations in non-scientific media than in strictly scientific journals indicating that his work (at least as a co-author) is widely recognized.

Dr Solarz contributed to a number of scientific projects financed by external agencies. However, during more than 20 years in science he did not serve as a project leader of a scientific grant. Apparently, he also did not have any scientific internships abroad. This fact is surprising given the frequent contribution of international co-authors and his membership in international societies. Apparently, he is not sufficiently connected to international research networks. This is a weak point of this application.

I have to say that I did not contact the authorities of his Institute for additional background information. My opinion is solely based on the material sent to me and on common scientific data bases.

Publications linked to the application

Dr Solarz scientific work is mainly centered around alien species. Six respective papers are linked to the present application. These deal with rotifers, bacteria, mammals, birds and plants, thus covering a wide spectrum of taxa where introduced species are common and interact with the native flora and fauna. This broad spectrum is a strong aspect of the application. It demonstrates that Dr Solarz is not fixed to a single taxon but rather centers his work around an ecological problem.

All six papers appeared in international middle to higher ranking (IF: 1.63-4.77) ecological and conservational journals. I missed top ranking publications. It is not my task to review these papers again. This has already been done by the journal referees. My task is to assess whether these papers are sufficiently strong to serve as the basis of a habilitation application and whether they form a coherent cycle centered around a specific research program. This is only partly the case. As written above, I'm concerned about the contribution of Dr Solarz to these papers. In only two of them he served as lead authors (in five as corresponding author). However, the Div. and Distr. and the EcoHealth papers with Dr Solarz as lead author are only comments / letters. They do not contain original research and should not have been included into the present application. Further, the estimated author contributions to the other papers appear to be overestimated given the number of co-authors and the position of Dr Solarz within the author list. Specifically, with respect to H1 Dr Solarz writes: *Mój wkład w powstanie tej pracy polegał na zdefiniowaniu problemu naukowego, określeniu grupy badanych organizmów, opracowaniu koncepcji badań, analizie danych dotyczących dróg ekspansji badanych organizmów, interpretacji wyników tej analizy, napisaniu części artykułu*

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(w rozdziałach *Introduction, Materials and Methods, Results, Discussion*) i poprawie artykułu po uwagach recenzentów. Mój udział procentowy szacuję na 60%. Dr Wilk-Woźniak writes; mój udział polegał na: opracowaniu koncepcji pracy, zabraniu i analizie danych o występowaniu badanych gatunków i ich wymaganiach siedliskowych, napisaniu pierwszej wersji pracy, naniesieniu korekty po otrzymaniu recenzji. Given this and the declarations of the two other authors I have serious doubts about the 60% contribution of Dr Solarz. Regarding H2 Dr Solarz declares: *Mój wkład w powstanie tej pracy polegał na zdefiniowaniu problemu naukowego, określeniu grupy badanych organizmów, opracowaniu koncepcji badań, opracowaniu metodyki, analizie danych dotyczących statusu gatunków, interpretacji wyników tej analizy, napisaniu pierwszej wersji artykułu, uwzględnieniu uwag współautorów i poprawie artykułu po uwagach recenzentów. Mój udział procentowy szacuję na 70%*. Dr Pociecha writes: *mój udział polegał na zbieraniu danych publikacyjnych dotyczących gatunków wrotków (Rotifera) w odniesieniu do statusu ekologicznego gatunków ...; interpretacji otrzymanych wyników, merytorycznym opracowaniu klasyfikacji; współtworzeniu i pisaniu artykułu*. Additionally Dr Wilk-Woźniak declares 'opracowanie koncepcji pracy'. Again I have doubts about the 70% contribution of Dr Solarz. H5 looks fine. Regarding H6 Dr Najberek apparently had the largest impact on the paper as Dr Solarz wrote only part of the discussion. I doubt whether this adds to 35% contribution.

A central issue of the work of Dr Solarz is the impact of alien species on native ecological communities and human life and welfare. Particularly, he studies invasiveness and alienness. This might be the place for a critical discussion of the philosophical background of the approach of Dr Solarz as he centres his work around (assumed) negative impacts of alien species. 'Negative impact' is a human category that should not be applied to ecological systems. It might apply to economy, to human health, or to food quality, broadly speaking to human welfare. However, high biodiversity or ecological stability are not such categories as they even might decrease human welfare. Large scale invasions (for instance European post-glacial) are inherent to nature and I guess that 95% of all alien species do even not infer into current ecological interactions. Short time negative impacts on biodiversity *per se* are not negative as these are natural processes where native (and alien) species are under increased selective pressure. They rarely die out. And what about natural invasions in the ongoing course of postglacial colonization? Dr Solarz defines alien species as only those directly introduced by human activity (in the summary of scientific accomplishments). But what is human activity, not mentioning the famous baseline problem? However, this is a discussion

that goes beyond the present application. Philosophy is not a criterion of habilitation assessment.

A major achievement of Dr Solarz is the data base on alien species in Poland, although this data base is a project of the Institute of Nature Protection and many people are involved in the project. Similar data bases were built up prior, for instance GISD. Importantly, this data base tries to include all type of organismal, including bacteria, protists and different types of parasites.

Bacteria is the taxon studied in H1 and H2. However, Dr Solarz rightly highlights in H1 it is not clear whether they occur due to human activity. Given his own definition these bacteria should not be classified as 'alien'. It seems likely that they simply colonized Europe recently. H1 is a rather simple descriptive 'faunistic' paper based on a literature analysis. H2 extends an existing framework for the assessment of alienness by an another, 9th criterion. The major result was that criterion 1 (appearance in areas where not found previous) was best to describe aliens (so why the additional criterion?). However, this criterion is in certain contradiction to the definition that aliens are introduced by human activity. It is indicative for fast natural colonization, too. Such fast colonization is common in insects and has been well studied in butterflies, but also in parasitic Hymenoptera. I do not assess H3 and H4 as these are comments only. H5 deals with hybridization between red deer and sika deer and is a confirmatory study on work previously done in Great Britain. Maybe it is again a matter of philosophy, but I completely don't understand why such hybrids should be harmful as argued in the study. Rather they increase genetic diversity. That's fine. H6 is a floristic study on the occurrence of Balfour's impatiens, a species introduced from Asia a century ago. The paper identifies and discusses possible factors limiting and promoting colonization. In my view H6 is the strongest paper in this series but unfortunately Dr Solarz has the lowest contribution.

In summary, I have doubts whether the papers linked to the achievements are strong enough for a successful habilitation. I have also doubts about the author contribution. The papers are mainly descriptive and have review rather than original problem solving character.

Other scientific activities

Apart from the papers that entered the main achievement Dr Solarz has published 72 other scientific papers, 25 of them in international journals. He is member of three scientific societies.

So far, Dr Solarz coordinated three projects centered around invasive species financed by the mother institute, the US Department of State, and the Polish Nature Conservation Agency. He did not head any scientific research grant.

Dr Solarz reviewed four submissions to international journals (Nature Cons., J. Appl. Ecol., Div. Distr., Biol. Inv.). This is not a strong argument in favor of the international reputation of Dr. Solarz. Given his activity in international boards and organizations I expected to see a much broader involvement in the international peer review network. The application is quiet about the scientific and methodological toolbox of Dr Solarz.

In summary the other scientific activities fulfil the current standards for a Polish habilitation. However, they are not strong.

Didactic activities

Dr Solarz is based in an institute of the Polish Academy of Sciences. Consequently, he has no daily contact with students. Nevertheless, he promoted several master and bachelor theses and supervised student professional internships. He also served as a co-supervisor of one PhD project (Kamil Najberek). Dr Solarz provided lectures on biological invasions at UJ, UAM, and other universities as well a popular sciences lectures. These didactic activities are typical for PAN scientists and do not raise concern.

Other activities

Dr Solarz is very active in the popularization of the 'problem' of invasive (alien) species. He served as an expert and delegate of the Ministry of the Environment. He presented more than 20 expert opinions presented by Poland at diverse international meetings on invasive species. Popularization activities included more than 60 interviews and contributions for diverse radio and television stations, as well as print media interviews. In 2009-2014 and 2014-2015, he was a member of the National Council for Nature Conservation. He also served as a member of nearly 30 international and national scientific and bioconservation consortia. Since 2015 he is chair of the Bern Convention expert group on invasive alien species. These activities form the strongest part of the present application and do not raise concerns.



Conclusion

My final verdict has to weight the scientific, organizational and teaching activities of Dr Solarz. Dr Solarz is engaged in the ecology and importance of invasive species. His organizational and teaching activities do not raise concerns. However, the habilitation is a scientific degree. In this respect the application falls short. The six papers linked to the achievement are only loosely connected and the contribution of Dr Solarz to each paper is limited and not to the end clear. They do not present really new findings, concepts or methods but to a larger extent are descriptive and confirmative.

In my view, Dr Wojciech Solarz does not fulfill the requirements defined by art. 18 and 18a on scientific degrees and titles of the Polish law on higher education from 2003 (changed by Dz. U. 2017, poz. 1789 and Dz. U. 2018, poz. 1669) and from 2018 (art. 179). I do not support his application to obtain the habilitation degree in the field of Biology.

Toruń, 07.11.2019



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