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## Review of the habilitation proposition of Dr Dawid Moron

### General remarks

Dawid Moron is based at the Institute of Systematics and Evolution of Animals of the Polish Academy of Sciences, department of invertebrate zoology. He received his master degree in 2003 with a thesis on “Effect of the expected life expectancy on the division of labour in European fire ants (*Myrmica rubra* L.)” supervised by Prof. Michał Woyciechowski. He continued his work on Hymenoptera and was promoted in 2009 with a thesis on “The impact of heavy metal pollution on mason bees (*Osmia rufa* L.) and the diversity of other wild bees” again supervised by Prof. Woyciechowski. Since 2008 he is employed at the Institute of Systematics and Evolution of Animals. Between 2013 and 2016 he had a three year post doc at the Posen University of Natural Sciences.

Dr Moron is an expert in the ecology of aculeate Hymenoptera, particularly of pollinators. Since his PhD he has studied the diversity, behavior, and functioning of pollinating bees in agricultural in industrial landscapes, particularly in polluted areas. This work is well embedded in the study directions of the work group of Prof. Woyciechowski as well as the Posen group of Prof. Tryjanowski. Apparent is also the influence of Josef Settele, the head of the Department of Community Ecology at Helmholtz-Centre for Environmental Research in Halle. I notice this influence as a stronger point of his applications as is shows that Dr Moron is in contact with leading internationally active ecologists. This cooperation has boosted his scientific activity and international visibility. It contrasts, however, to the low proportion of

international co-authors in his papers. It might be that the cooperation was mainly due to the work of his scientific supervisors, Prof. Woyciechowski and Prof. Tryjanowski.

Since 2005 Dr Moron has published 31 papers in international scientific journals indexed in Scopus. He co-authored three book chapters edited by international publishers. This work is accomplished by 14 additional papers in local journals. The publications received 580 citations (515 without self-citations; retrieved 06.04.2019) resulting in a Hirsch index of 14. This scientific output is high with respect to typical Polish habilitations. The number of citations is reasonable after 15 years in science but not outstanding. In 10 of the 31 indexed publications Dr Moron served as lead author.

In my view the most important publication is the one on “Wild pollinator communities are negatively affected by invasion of alien goldenrods in grassland landscape” published 2009 in *Biological Conservation*. This paper received 87 citation to date (retrieved 06.04.2019) and demonstrated the negative impact of alien plant species on indigenous hymenopteran pollinators.

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**

The present application is based on five papers in middle (*Insect Conservation and Diversity*) to high (*Diversity and Distributions*) ranking journals having a total IF = 16 and thus an average IF > 3. This is well within the standards for a Polish habilitation and does not raise concerns. In all of these papers Dr Moron served as lead author. The five papers center around pollinator diversity in anthropogenic landscapes but deal with various topics: railway embankments (Moron et al. 2014, 2017), levees (Moron et al. 2017), and goldenrod invasions (2018a, b).

I found the general scientific question of Dr Moron interesting. Do anthropogenic habitats contribute to bioconservation and how large is this impact? In general, ecologists ask the other way round, how to preserve natural habitats to conserve diversity. Indeed, in temperate regions anthropogenic habitats are most often open and (semi-)xeric areas. Open grasslands are known to be more species rich than forests that form the typical natural land cover in Central Europe. Therefore, we can expect that the formation of open landscapes, if

appropriately managed, increases opportunities for xerothermic invaders and particularly pollinator species like bees and butterflies. The major question is whether these neobiota are sufficiently heterogeneous to support a high biodiversity. Agricultural landscapes are surely too monotonous for that task.

In the first two papers associated with the achievement Moron et al. (2014, 2017) showed that railway embankments increase pollinator diversity (alpha and beta) with respect to extensively used meadows. This is an important (although expected) finding. Ruderal floras are always species rich. Nevertheless it is a proof of concept. However, I wondered about the baseline problem. Would the railway embankment effect be the same 300 years ago? Or is this effect the result of the already reduced diversity in comparison to natural sites? In turn, it might even be the case that insect diversity is currently higher than in any previous postglacial period, despite the low total abundances due to human impact.

The third paper (Moron et al. 2017) is closely related to the two previous ones despite the different study subject. Again, man-made structures, levees, turned out to harbour a more diverse flora and a similar pollinator fauna as grasslands that served as control. It is not my role to play a super-referee of these three studies. They appeared in higher ranking journals. However, I have one principle concern. All three studies did not include area effects. As richness generally increases with study area, respective area difference in the three papers of this series might have affected the results.

The last two papers linked to the present application deal with the impact of the invasive goldenrod (*Solidago*) species. The major result was that the invasive plant species did not influence native pollinator diversity until the plant reached a high degree of dominance (up to nearly monodominance). Thus, dominance and not invasiveness determined diversity patterns. Pollen and nectar availability were major predictors of pollinator richness. Thus, the papers confirm that resource availability is the major driver of pollinator community composition. I note that this interpretation differs from that of the authors, that highlight the negative effects of goldenrod invasions.

In conclusion, the five papers linked to the present application pose important research questions and demonstrate the value of anthropogenic habitat structures as surrogates for vanishing natural environments. This is an important contribution to conservation ecology. The five papers are published in medium to high ranking international journals. They clearly satisfy the requirements for a successful habilitation application.

### **Other scientific activities**

Other scientific activities of Dr Moron are centered around the behavioral ecology of ants, insect and bird responses to invasive plant species, and ecotoxicology. This work demonstrates a wider focus on different aspects of biodiversity and human impact. In this respect, the study of post-industrial areas is of major importance. Although it has been shown prior that abandoned industrial or military areas are important refugia for many endangered plant and animal species, respective work in Poland is still scarce. Lenda et al (2012, with Dr Moron being coauthor) demonstrated that gravel excavation sites might play an important role in bioconservation. Again this study confirms that abandoned sites, irrespective of being anthropogenic or semi-natural, have increased diversity.

Another publication by Dr Moron as lead author that I want to highlight is the 2012 paper in the American Naturalists on the risk strategies of ants. In this paper, Moron et al. demonstrate that life expectancy (and not total age) is a major determinant of taking risks. Thus, ants are able to assess their future life expectancy and to adjust their behavior.

In general, the scientific activities of Dr Moron are well within the requirements of a Polish habilitation application. The quality of his publications do not raise concerns and are above the average level. A critical point is the weak international cooperation.

### **Didactic activities**

Being based at an institute of the Polish Academy of Sciences Dr Moron does not have daily contact with bachelor or master students. So far he promoted one bachelor and one master student and provided a limited number of courses. As the habilitation is mainly a scientific degree (at least within the framework of the new Polish Law on Higher Education, § 219) this limited teaching experience does not influence the final conclusion. Nevertheless, in its original meaning the habilitation includes the *venia legendi* (*facultas docendi*) and thus confirms the suitability for teaching at a university. Several hours of teaching after 15 years in science is quite low and surely not enough to become convinced about the didactic qualification of the candidate.

### **Other activities**

Dr Moron frequently reviews submission to leading ecological journals and foreign research agencies. This activity, although typical, demonstrates that he is a well-recognized expert in the ecology of anthropogenic landscapes.

So far he headed two national grants (KBN and NCN Fuga). I missed abroad internships. He only mentions two short term stays in Turin (Italy) and Reading (GB). However, the purposes and scope of these stay remain unclear. I cannot see whether these stays resulted in any scientific cooperation or joint publications. This is a weak point of his application.

Dr Moron is clearly a pure scientist. I missed any mentioning of other activities, ranging from conservation to the popularization of science. Given that he is based in an institute of the Polish Academy of Sciences partly devoted to biodiversity I expected to see a wider scope and popularization activities. Particularly, I missed activities in international or national bioconservation networks or agencies. At least, his application (as well as his web page) is silent about this point. For comparison I looked at the Google Scholar citations (837, retrieved 07.04.2019). These contain not only scientific citations but also the general public ones. The quotient of Google Scholar and Scopus citations is therefore a crude indication of the public impact of a scientist. In conservation biology I expected at least 1.5 times more Google Scholar than Scopus citations. The value of Dr Moron ( $837/580 = 1.44$ ) confirms the strict scientific orientation.

### **Conclusion**

My final verdict has to weight the scientific, organizational and teaching activities of Dr Moron. Dr Moron is an internationally well-recognized scientist engaged in the ecology and conservation of pollinating insects. His scientific achievements are remarkable and well within the standards for a Polish habilitation. Somewhat weaker are his didactic and public (organizational) activities. However, the habilitation is a scientific degree. In this respect, the present application is sufficiently strong.

In my view, Dr Dawid Moron fulfills 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 support his application to obtain the habilitation degree in the field of Biology.

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