Open research and ecological networks: an early career researcher's experience

Ben Hawthorne

PhD Student, School of Natural and Environmental Sciences.

Introduction

As a PhD student, I am fortunate to have supervisors and mentors who introduced me to open research, taking examples from their own practices. Therefore, I have been able to learn these habits and start my research career as I wish to proceed. In this case study, I will present the practices I have implemented to date and what I aim to achieve during my PhD, as well as the challenges and benefits I have encountered.

Research Context

My research applies metabarcoding (identification of species from DNA) for biomonitoring and assessments of agri-environment schemes for the impact on entomology and ecological networks. Ecological networks are a product of the intra- and inter-species interactions within an environment; studying these has facilitated the reflection on my own research philosophy, and how I wish to interact with other researchers. Open research naturally increases the number of beneficial interactions between research and the audience (e.g. researchers, policy makers, and members of the public), thus driving me to implement these practices.

Open Research Practices

An output of my first year is a literature review about biomonitoring with metabarcoding for agricultural entomology. I was motivated to share my findings of this developing field to benefit researchers new and seasoned to metabarcoding, and to invite constructive input. Therefore, I published this as a preprint on Open Science Framework[1], which eventually got published in *Agricultural and Forest Entomology*[2], a peer-reviewed and open access journal.

During fieldwork and lab work in my first year, I followed open protocols on Protocols.io, which I am writing for my own work to increase the transparency and reproducibility of my research. I also co-authored a publication in another open access journal, *Ecological Entomology*, where we published the data and code via Zenodo[3]. I similarly hope to publish data from my PhD to be reused as secondary data, contributing towards 'reduction' of animals used in science (one of the 3 R's in animal research ethics), as invertebrate mortality is involved for metabarcoding.

To encourage discussions about open research amongst my peers, I co-organised an away day for Ecosystems Group postgraduates in August 2023 and invited Dr Helen Gray, local lead for the UK Reproducibility Network, to conduct a workshop on open research practices. We assessed how PGRs can integrate open research into our own projects, which I hope to see practiced by others in coming years.

Challenges

Publishing open data is perceived as challenging when stakeholders are involved. For example, there is metadata from farms I am collecting samples from which land managers do not wish to be shared (e.g. pesticide usage). I was advised to be as open as possible and as closed as necessary, which is a great principle to ensure open and reusable data, which respects the needs of stakeholders.

Benefits

Open research has societal benefits, such as being more inclusive by removing paywalls and increasing transparency, leading to greater involvement and advancements of knowledge and ideas across the community. This is especially crucial in ecology, given the global environmental crises we're facing. Furthermore, there is a greater accountability for research, which increases the quality and clarity of outputs. Personally, I have gained exposure at an early career stage, which has already prompted interactions and collaborations for future research opportunities – though it is never too late to integrate them in one's research.

Lessons Learned

I have learned that what seemed like additional work actually saved time in the long run. These outputs are easily integrated into a thesis, which I would encourage other postgraduate researchers to consider. Additionally, being mindful of the audience can improve the clarity of writing, particularly for open protocols and code. Finally, the open research community does not demand perfection, but rather encourages best efforts.

Conclusion

Through the lens of networks, implementing open research practices increases the number of beneficial interactions with higher-quality and transparent research, enhancing our collective efforts to advance knowledge and understanding. This is highly advantageous to the research community, and to any early career researcher.

References

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