

A Community-Driven Strategy for Addressing Fossil Taxonomy Challenges

Holly Little[‡], Talia Karim[§], Erica Krimmel[|], Lindsay J. Walker[¶]

[‡] Smithsonian National Museum of Natural History, Washington, DC, United States of America

[§] University of Colorado, Boulder, United States of America

[|] independent, Sacramento, United States of America

[¶] Arizona State University, Tempe, United States of America

Corresponding author: Holly Little (littleh@si.edu)

Abstract

Taxonomy has long been a cornerstone issue in the paleontological collections community, especially as digitization has enabled us to share data at a global scale. Communities of practice such as the Paleo Data Working Group (PDWG, Krimmel et al. 2021) have made concerted efforts to understand and evaluate challenges with the taxonomic information published via fossil occurrence records (Little et al. 2021, Little et al. 2022). Since 2020, PDWG has been leading discussions to define the nuances of challenges associated with fossil taxonomy, to look at the landscape of cyberinfrastructure tools available to tackle these challenges, and to develop community guidelines. This work has led to a deeper understanding of the full range of challenges surrounding the use of fossil taxonomy, from local practices and systems to representation at the data aggregator level. Here we share our initial strategy for tackling challenges with fossil data, particularly taxonomy, centered on developing a reusable framework for assessing and addressing issues so that data can be made more discoverable and usable for transformative and translational research.

An essential element of this approach is the coordination of efforts across stakeholder communities. Through these collaborations, we ultimately seek to improve systems for handling and curating taxonomic data, increase the quality and discoverability of taxonomic data presented by aggregators, and better integrate data provided by fossil occurrence records into the research lifecycle. The required coordination will be driven through the development of a partner network from across the global bio- and geo- science data ecosystem. This network is composed of representatives with a variety of perspectives and roles, including participation from [Catalogue of Life](#), [Global Biodiversity Information Facility](#), and [Biodiversity Information Standards](#) (TDWG), as well as paleontology collections professionals (led by PDWG), informaticians, researchers, and other end-users. Integrating the existing PDWG community of practice into this larger network allows us to learn from work already underway in the landscape. In addition, recognizing that the paleo community is not alone in these challenges, we believe that a successful strategy for this network is to

create processes and envision solutions that can be adapted by other disciplines with similar needs.

Our strategy underscores the need for the combined efforts of both community engagement and evaluation of the existing technical landscape. Through this work we aim to establish an enhanced network of FAIR (Findable, Accessible, Interoperable, Reusable; Wilkinson et al. 2016) and research-ready fossil data, improving the support for and quality of fossil taxonomy data along the way.

Keywords

paleobiology, paleontology, community guidelines, data mobilization

Presenting author

Holly Little

Presented at

TDWG 2023

Conflicts of interest

The authors have declared that no competing interests exist.

References

- Krimmel E, Karim T, Little H, Walker L, Burkhalter R, Byrd C, Millhouse A, Utrup J (2021) The Paleo Data Working Group: A model for developing and sustaining a community of practice. *Biodiversity Information Science and Standards* 5 <https://doi.org/10.3897/biss.5.74370>
- Little H, Karim T, Krimmel E (2021) Improving the Adoption and Evolution of Data Standards for Fossil Specimens. *Biodiversity Information Science and Standards* 5 <https://doi.org/10.3897/biss.5.75646>
- Little H, Byrd C, Karim T, Krimmel E, Norton B (2022) Extinct Taxa in an Extant World: Working towards better fossil taxonomic representation. *Biodiversity Information Science and Standards* 6 <https://doi.org/10.3897/biss.6.94417>
- Wilkinson M, Dumontier M, Aalbersberg IJ, Appleton G, Axton M, Baak A, Blomberg N, Boiten J, da Silva Santos LB, Bourne P, Bouwman J, Brookes A, Clark T, Crosas M, Dillo I, Dumon O, Edmunds S, Evelo C, Finkers R, Gonzalez-Beltran A, Gray AG, Groth P, Goble C, Grethe J, Heringa J, 't Hoen PC, Hooft R, Kuhn T, Kok R, Kok J, Lusher S, Martone M, Mons A, Packer A, Persson B, Rocca-Serra P, Roos M, van Schaik R, Sansone S, Schultes E, Sengstag T, Slater T, Strawn G, Swertz M, Thompson M, van

der Lei J, van Mulligen E, Velterop J, Waagmeester A, Wittenburg P, Wolstencroft K, Zhao J, Mons B (2016) The FAIR Guiding Principles for scientific data management and stewardship. *Scientific Data* 3 (1). <https://doi.org/10.1038/sdata.2016.18>