

Capturing and Using Taxonomic Knowledge for Species Identification

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Abstract

The skills and knowledge needed to recognize and classify taxa are becoming increasingly scarce in the scientific community, resulting in a “taxonomic impediment”, where such knowledge is gradually disappearing (Engel et al. 2021). At the same time, it is clear that these skills are strongly needed in biodiversity monitoring for management and conservation, especially when carried out by citizen scientists. Formalizing the knowledge required to distinguish taxa from one another in the form of open digital identification keys is one way of making such knowledge more findable, accessible, interoperable and reusable ([FAIR](#)) for professional and amateur observers of biodiversity.

Experience working with taxonomic experts to capture taxonomic knowledge in a tabular, multiple access format has proven that important nuances in taxonomic knowledge cannot be captured in a tabular format in a practical manner. Features like taxonomic hierarchy, rich metadata, formalized geographical scope, multilingualism, numerical ranges, logical premises, and links to external services are all much needed improvements of digital identification keys. However, these are complex to capture in a tabular format, defeating the benefits of its general simplicity. To address this, we have developed Clavis, an open format for identification keys written in JavaScript Object Notation (Koch et al. 2022). The goal is to create an ecosystem where different implementations and mappings of the Clavis format can serve the needs of various users and institutions, while maintaining knowledge exchange.

Having a versatile format as a foundation, a crucial next step was to offer experts a tool to edit and test identification keys, and provide end-users with a tool to access this information. In this presentation, we show the Clavis format itself, as well as an online editing tool and a end-user interface, available on clavis.no. Providing a more advanced use case, we demonstrate how we implement Clavis in tandem with computer vision, providing users with a single tool to quickly and reliably identify taxa using different technologies.

Keywords

digital identification keys, citizen science, data format, taxonomy, FAIR

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Conflicts of interest

The authors have declared that no competing interests exist.

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