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Conference Abstract

DiSSCo Flanders and ILVO-CMS: Unlocking and Enhancing the Management of Natural Science Collections in a Belgian Research Institute

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Abstract

Effective management of natural science collections is crucial to maximizing their scientific value. They often contain invaluable items like type specimens and reference material, and data that contributes significantly to our understanding of biodiversity, ecology, and evolution. Research institutes often harbor several smaller collections, which are seldom managed properly, as collection management is not their core business, and because they are not directly connected to the natural science collection community. Recognizing these challenges, DiSSCo Flanders (Distributed System of Scientific Collections) has set out to develop a standardized infrastructure for managing natural science collections, ensuring their proper long-term conservation, and facilitating future reuse (Trekels 2022).

Within the DiSSCo Flanders consortium of 14 Belgian institutes, we inventoried the collections utilizing the SYNTHESYS+ survey (Van Baelen 2022) and evaluated their state and management practices using the Collections Self-Assessment Tool (CSAT) (Van Baelen, in preparation). At the Flanders Research Institute for Agriculture, Fisheries and Food (ILVO, Belgium), 15 collections comprising over 558,000 items were cataloged.

A significant portion of these, approximately 95%, are marine fish otoliths used for age determination and stock assessments of commercially important fish species. Additionally, ILVO has around 21,000 food- and plant-related items housed within microbial collections. These are instrumental in research related to plant pathology, food spoilage, and biocontrol methods. Furthermore, ILVO maintains several smaller, yet equally important collections. These include insect specimens, macrobenthos reference specimens, an array of seeds and azalea cultivars, marine and agricultural soil samples, and DNA samples from various of the aforementioned collections.

To align with the FAIR principles (Findable, Accessible, Interoperable, Reusable) and to connect with the DiSSCo Europe Research Infrastructure, ILVO developed an in-house Collection Management System (CMS). This web application, utilizing a normalized relational database structure, generates dynamic and customizable web pages. It allows users to input, edit, search, and export data through a user-friendly, browser-based interface that supports multiple languages. Data can also be uploaded using custom Microsoft® Excel® templates that conform to the specific data model, ensuring that data is consistently formatted and easily integrable. The back end of the system is responsible for managing the collections and vocabularies (largely aligned with the Darwin Core standard (Darwin Core Task Group. 2009)), while the front end dynamically generates the multilingual user interface and collection-specific vocabularies. This flexibility provides a tailored experience for users based on the specific nature of the collections they are managing, which is particularly important for an institute like ILVO, with diverse collections that require different terminologies and data structures. ILVO-CMS also boasts features that extend beyond basic data management. Users can attach documents and pictures; they can create relationships between items; there are functionalities for referencing other databases; and the system is able to track transactions, such as loans.

Though custom-developed for ILVO, the platform's adaptability enables easy customization and implementation for other institutes and (smaller) collections globally. The usage of ILVO-CMS at ILVO will significantly improve the management, organization, accessibility, and exchangeability of the collections, enhancing their scientific value. By implementing such a comprehensive management tool, ILVO is better positioned to ensure that the collections are not only preserved for future generations but also readily available for ongoing and future research projects.

One of the key future goals for ILVO-CMS is the incorporation of 3D images. These virtual representations of physical items will enhance the ability to study and share specimens, through their 3D images, without the need for physical handling, thereby reducing the risk of damage or loss. Additionally, we are committed to the further development of a user-friendly interface to facilitate the (re-)use of ILVO collections, both internally and externally. This includes integrating and updating features based on user feedback and linking a taxonomic backbone, such as that of the Global Biodiversity Information Facility (GBIF Secretariat 2023).

ILVO's experience demonstrates that through opportunities like DiSSCo Flanders, which bring in temporary funding and promote a culture of collaboration, research institutions without public-oriented collections may contribute to global natural science collections.

Keywords

collection management system, digitization

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Conflicts of interest

The authors have declared that no competing interests exist.

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