

Integrating Taxonomic Names and Concepts from Paper and Digital Sources for a New Flora of Alaska

Campbell O Webb[‡], Stefanie M Ickert-Bond[‡], Kimberly J Cook[§]

[‡] University of Alaska Museum of the North, Fairbanks, United States of America

[§] Indiana University, Bloomington, United States of America

Corresponding author: Campbell O Webb (cowebb@alaska.edu)

Abstract

The taxonomic foundation of a new regional flora or monograph is the reconciliation of pre-existing names and taxonomic concepts (i.e., variation in usage of those names). This reconciliation is traditionally done manually, but the availability of taxonomic resources online and of text manipulation software means that some of the work can now be automated, speeding up the development of new taxonomic products. As a contribution to developing a new Flora of Alaska (floraofalaska.org), we have digitized the main pre-existing flora (Hultén 1968) and combined it with key online taxonomic name sources ([Panarctic Flora](#), [Flora of North America](#), [International Plant Names Index](#) - IPNI, [Tropicos](#), Kew's [World Checklist of Selected Plant Families](#)), to build a canonical list of names anchored to external Globally Unique Identifiers (GUIDs) (e.g., IPNI URLs). We developed taxonomically-aware fuzzy-matching software (*matchnames*, Webb 2020) to identify cognates in different lists. The taxa for which there are variations between different sources in accepted names and synonyms are then flagged for review by taxonomic experts. However, even though names may be consistent across previous monographs and floras, the taxonomic concept (or circumscription) of a name may differ among authors, meaning that the way an accepted name in the flora is applied may be unfamiliar to the users of previous floras. We therefore have begun to manually align taxonomic concepts across five existing floras: Panarctic Flora, Flora of North America, Cody's Flora of the Yukon (Cody 2000), Welsh's Flora (Welsh 1974) and Hultén's Flora (Hultén 1968), analysing usage and recording the Region Connection Calculus (RCC-5) relationships between taxonomic concepts common to each source. So far, we have mapped taxa in 13 genera, containing 557 taxonomic concepts and 482 taxonomic concept relationships. To facilitate this alignment process we developed software (*tcm*, Webb 2021) to record publications, names, taxonomic concepts and relationships, and to visualize the taxonomic concept relationships as graphs. These relationship graphs have proved to be accessible and valuable in discussing the frequently complex shifts in circumscription with the taxonomic experts who have reviewed the work. The taxonomic

concept data are being integrated into the larger dataset to permit users of the new flora to instantly see both the chain of synonymy and concept map for any name. We have also worked with the developer of the [Arctos Collection Management Solution](#) (a database used for the majority of Alaskan collections) on new data tables for storage and display of taxonomic concept data. In this presentation, we will describe some of the ideas and workflows that may be of value to others working to connect across taxonomic resources.

Presenting author

Campbell O Webb

Presented at

TDWG 2021

Funding program

U.S. National Science Foundation: Advances in Biological Informatics

Conflicts of interest

References

- Cody WJ (2000) Flora of the Yukon Territory. NRC Research Press <https://doi.org/10.1139/9780660181103>
- Hultén E (1968) Flora of Alaska and Neighboring Territories. Stanford U. Press, Stanford, CA.
- Webb CO (2020) Matchnames: Reconciling variations in taxonomic names. 1.2.1. URL: <https://github.com/camwebb/taxon-tools>
- Webb CO (2021) TCM: a web app for managing taxon concepts and their interrelationships. URL: <https://github.com/akflora/tcm>
- Welsh SL (1974) Anderson's Flora of Alaska and adjacent parts of Canada. Brigham Young University Press, Provo, UT.