

Assessing Identification Accuracy of Research Grade iNaturalist Observations in Lichens and other Taxonomically Difficult Organisms

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Abstract

Community science-generated biodiversity data can provide essential information for understanding species distributions, behaviors and conservation statuses. However, their utility can be limited due to high uncertainty and variability in quality, especially for small taxonomically difficult organisms like fungi and insects. One important set of community-generated data that are increasingly used by scientists are Research Grade (RG) iNaturalist observations. These observations are aggregated into the [Global Biodiversity Information Facility](#) database. Here we assessed the accuracy of RG lichen observations in iNaturalist. Lichens are mutualistic symbioses formed between fungi and a photosynthetic partner, either algae or cyanobacteria that occur in every terrestrial ecosystem on the planet (Brodo et al. 2001). They are sensitive indicators of environmental health, especially air quality, and provide essential food and nesting material for animals, along with performing many other ecosystem services (Allen and Lendemer 2021, Brodo et al. 2001, Nimis et al. 2002). We examined hundreds of observations and determined if the identification was correct, if it was not possible to identify the observation given the data provided, or if the identification was incorrect. Identification accuracy of selected species varied widely, from zero observations with enough information for correct identification (e.g., *Rhizocarpon geographicum* and *Cladonia chlorophaea*) to 100% correct identifications (e.g., *Cetradonia linearis* and *Physconia subpallida*, McMullin and Allen 2022). Most frequently, species that require microscopic examination or chemical tests for accurate identification were unable to be verified versus those that require only macromorphology. We provide a series of suggestions for best practices to improve the quality of RG observations and thus the utility of community-generated observation data for taxonomically difficult organisms.

Keywords

data quality, citizen science, big data

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Presented at

TDWG 2022

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