Plant-pollinator Vocabulary - a Contribution to Interaction Data Standardization

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Abstract

Human demands on resources such as food and energy are increasing through time while global challenges such as climate change and biodiversity loss are becoming more complex to overcome, as well as more widely acknowledged by societies and governments. Reports from initiatives like the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) have demanded quick and reliable access to high-quality spatial and temporal data of species occurrences, their interspecific relations and the effects of the environment on biotic interactions. Mapping species interactions is crucial to understanding and conserving ecosystem functioning and all the services it can provide (Tylianakis et al. 2010, Slade et al. 2017). Detailed data has the potential to improve our knowledge about ecological and evolutionary processes guided by interspecific interactions, as well as to assist in planning and decision making for biodiversity conservation and restoration (Menz et al. 2011).

Although a great effort has been made to successfully standardize and aggregate species occurrence data, a formal standard to support biotic interaction data sharing and interoperability is still lacking. There are different biological interactions that can be studied, such as predator-prey, host-parasite and pollinator-plant and there is a variety of data practices and data representation procedures that can be used.

Plant-pollinator interactions are recognized in many sources from the scientific literature (Abrol 2012, Ollerton 2021) for the importance of ecosystem functioning and sustainable agriculture. Primary data about pollination are becoming increasingly available online and can be accessed from a great number of data repositories. While a vast quantity of data on

interactions, and on pollination in particular, is available, data are not integrated among sources, largely because of a lack of appropriate standards.

We present a vocabulary of terms for sharing plant-pollinator interactions using one of the existing extensions to the Darwin Core standard (Wieczorek et al. 2012). In particular, the vocabulary is meant to be used for the term measurementType of the Extended Measurement Or Facts extension. The vocabulary was developed by a community of specialists in pollination biology and information science, including members of the TDWG Biological Interaction Data Interest Group, during almost four years of collaborative work. The vocabulary introduces 40 new terms, comprising many aspects of plant-pollinator interactions, and can be used to capture information produced by studies with different approaches and scales.

The plant-pollinator interactions vocabulary is mainly a set of terms that can be both understood by people or interpreted by machines. The plant-pollinator vocabulary is composed of a defining a set of terms and descriptive documents explaining how the vocabulary is to be used. The terms in the vocabulary are divided into six categories: Animal, Plants, Flower, Interaction, Reproductive Success and Nectar Dynamics. The categories are not formally part of the vocabulary, they are used only to organize the vocabulary and to facilitate understanding by humans.

We expect that the plant-pollinator vocabulary will contribute to data aggregation from a variety of sources worldwide at higher levels than we have experienced, significantly amplify plant-pollinator data availability for global synthesis, and contribute to knowledge in conservation and sustainable use of biodiversity.

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Conflicts of interest

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