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What's growing on at the Garden!

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MISSOURI BOTANICAL GARDEN INSTRUMENTAL IN CREATING AND MAINTAINING TAXONOMIC NAME RESOLUTION SERVICE

Computerized Tool Helps Researchers Standardize Lists of Biological Names.

(ST. LOUIS): The Missouri Botanical Garden has been instrumental in aiding iPlant Collaborative, the Botanical Information and Ecology Network, and others to create the **Taxonomic Name Resolution Service (TNRS)** which assists researchers in correctly identifying biological names.

Biological names are compared against those in **Tropicos®**, a database created by the Missouri Botanical Garden containing more than 1.2 million scientific names and 3.9 million individual specimen records. Tropicos® is actively maintained and updated by taxonomic experts at Missouri Botanical Garden and around the world.

In 1753, Carl Linnaeus published *Species Plantarum*, which introduced Latin binomials to the world and laid the foundation for how we name species and make sense of the diversity of life. This taxonomic naming system is still in place three and a half centuries later. Today, scientific names remain the necessary bond joining observations to organisms and data sets to each other. Scientific names are the currency of communication for ecologists studying tropical diversity, crop scientists searching for biological control and systematists assembling the Tree of Life. However, it turns out that a large fraction of the names that biologists are using are incorrect.

"Scientific names are the cornerstone of communication in the field of plant science. Surprisingly, a large fraction of the names that biologists are using are actually misapplied, making it next to impossible to accurately describe the number of species in a particular area. TNRS, using the authoritative data from Tropicos®, has the ability to quickly and efficiently solve this problem," said Chris Freeland, director of bioinformatics at the Missouri Botanical Garden.

(more)

ADD ONE: TNRS

Misspelled, outdated or ambiguous names are common and can lead to mismatched observations, erroneous conclusions and an inability to make predictions across space and time. Large databases, such as Global Biodiversity Information Facility and GenBank, suffer from high rates of taxonomic error, with up to 30 percent of names unmatched to any published species name. Even for published names, five to 20 percent are out-of-date names. The Taxonomic Name Resolution Service (TNRS) provides a web service to standardize taxon names so that biologists can ensure they are using the correct species names.

The TNRS works by taking names submitted by the user and breaking each down to its simplest parts. Users submit lists of scientific plant names to the TNRS. The names are passed through cycles of exact matching, parsing (breaking the name into its component parts), more matching and finally "fuzzy" matching. Fuzzy matching searches for near matches and enables the TNRS to correct even badly misspelled names. Once the names have been matched to published scientific names, the TNRS converts any out-of-date names (called synonyms) to the authoritative, currently accepted name.

"The Taxonomic Name Resolution Service is an important step forward for researchers across biology. For years, we have been trying to check species names for errors and bring them to a common taxonomy, painstakingly doing this name by name. Now we can do both steps for thousands of taxa at one online web service," said Dr. Amy Zanne, of the University of Missouri, St. Louis.

While the process sounds simple, it turns out that it is a difficult computational problem to solve. Originally, cleaning a list of taxonomic names would have to be done manually; a researcher would look up each name individually to confirm its accuracy. In recent years, some of these steps have been automated, but as separate processes. The TNRS performs all of these tasks together, simplifying and accelerating the chore of taxonomic name standardization.

While the TNRS currently resolves names only against Tropicos®, in the future it will be extended to include other taxonomic databases, such as the USDA list of names for plants in the United States, with the goal of including all published plant names. Since the software's source code is being released with an open source license, developers will be able to expand it to resolve scientific names of other organisms such as animals and fungi. iPlant collaborated with researchers Brian

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ADD TWO: TNRS

Enquist and Brad Boyle from Botanical Information and Ecology Network, Zhenyuan Lu from Cold Spring Harbor Laboratory, Sheldon McKay from Cold Spring Harbor Laboratory and later the University of Arizona, and Bill Piel from Yale's Peabody Museum to solve the names problem. They created a unique technical design that lead to the creation of the TNRS. The Missouri Botanical Garden provided vital access to the contents of their Tropicos® database of plant names. The TNRS builds on the work of Dmitry Mozzherin of the Marine Biological Laboratory, whose name parser from the Global Names Initiative was modified to break submitted names into constituent parts for the matching process, and Tony Rees of the Commonwealth Scientific and Industrial Research Organisation in Australia, whose TaxaMatch algorithm was adapted to perform fuzzy matching of misspelled names. Recently, a new Global Names Architecture effort received National Science Foundation funding and iPlant looks forward to collaborating closely with this group to tackle the remaining challenges in taxonomic name standardization.

For more information about the Missouri Botanical Garden's Tropicos® database visit: http://www.mobot.org/press/Assets/FP/tropicos.asp**.**

For general Missouri Botanical Garden information visit: www.mobot.org.

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NOTE: Digital images available by request. Download media materials at www.mobot.org/press.

The Missouri Botanical Garden's mission is "to discover and share knowledge about plants and their environment in order to preserve and enrich life." Today, 152 years after opening, the Missouri Botanical Garden is a National Historic Landmark and a center for science, conservation, education and horticultural display.

Additional links:
TRNS: http://tnrs.iplantcollaborative.org/ Offers overall information on the service, information about TNRS and information and links about all collaborators and sources used.

iplant: http://www.iplantcollaborative.org/ The main website for iPlant