

Prolific plant hunters provide insight in strategy for collecting undiscovered plant species

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Today's alarmingly high rate of plant extinction necessitates an increased understanding of the world's biodiversity. An estimated 15 to 30 percent of the world's flowering plants have yet to be discovered, making efficiency an integral function of future botanical research—but how is this best accomplished? Botanist Dr. Gerrit Davidse, John S. Lehmann Curator of Grasses at the Missouri Botanical Garden in St. Louis has collaborated with eight British botanists to quantify the role of plant collectors in the discovery of plant diversity. Their findings show a disproportionately high percentage of the world's plant discoveries have been made by just two percent of the world's most prolific and experienced collectors, implying that identifying and funding this small number of experts in the right geographic locations is vital to any effective strategy to document the world's flora. The study was published Wednesday, Feb. 1 in the British scientific journal *Proceedings of the Royal Society B*.

"The Global Strategy for Plant Conservation set forth by the Convention on Biological Diversity has outlined its target of a complete online world flora by 2020," said Dr. Bob Magill, senior vice president of science and conservation at the Missouri Botanical Garden. "The conclusion of this study can provide framework for the botanical community as to how we go about achieving this incredibly important goal."

Scientists are increasingly reliant on electronic databases to

communicate globally about the extensive amounts of plant specimen data that have been amassed. These central repositories of data have afforded scientists the opportunity to raise novel questions that were not possible before, exploring the dynamics of plant collecting in relation to our knowledge of how new [plant species](#) are discovered.

The study looked at four datasets from some of the world's major plant collections—the Missouri Botanical Garden, Royal Botanic Garden Edinburgh, Royal Botanic Gardens Melbourne and The Natural History Museum, London—and in all four instances found a huge difference in the distribution of types of specimens discovered by plant collectors. Roughly two percent of plant collectors were responsible for half of all types of specimens discovered, while approximately half of all plant collectors had each contributed only a single type of specimen. While this pattern has become slightly less marked in recent years, it is nonetheless remarkable for having persisted so strongly over time.

Closer examination of prolific plant collectors outlines a number of significant traits possessed by the group. The number of plant species discovered increases with the years of collection experience; the median number of species discovered per year by plant collectors active for less than a decade was just one, compared with nine to 18 species for collectors active for a decade or more. However, this increase in efficiency with experience is not correlated to the length of time actually spent in the field. The rate of species discovery for these prolific plant collectors actually decreases over the duration of collection activity; that is, they discover more in a shorter amount of time.

Geography also plays a part in explaining the success of prolific plant collectors. Although these experienced researchers tend to visit more countries, the vast majority of their plant species discoveries come from a single country. This cannot be attributed to their unique focus on a country with high plant diversity, as prolific collectors were no more

likely to collect from highly diverse countries than other, less prolific collectors.

Prolific plant collectors are typically generalists, although the most new species come from their most-collected families. However, a few collectors are highly specialized in the plants of a single family: Carl Luer of the Missouri Botanical Garden, an orchid specialist responsible for hundreds of species of orchids, is a notable example.

Prolific collectors also show a significant increase in their discoveries towards the end of their careers. Most specialize on a particular country, which leads to an increased knowledge of the flora in a particular area. The more years they collect plants, the better and faster they become at collecting new species. This observation highlights the critical role of the expertise gained from many years in the field. Experienced collectors may not collect as large a quantity of plants as novice collectors, but their accumulated botanical knowledge provides them with the skill to be selective, thus increasing the number of new species found.

Plant collecting is a specific part of the three-step process of plant species discovery (collection, recognition and publication), and as the numbers of professional taxonomists who classify plants decline, there has been a massive increase in the utilization of non-professionals to aid in this work. This study suggests that as science pushes for more rapid documentation of the world's flora, policy makers and funders must examine how best to develop the experience and skills of selected individuals to catalog undiscovered plants more efficiently.

"One way for institutions to encourage the development of these skills is in performance evaluations, rewarding effective field work on an equal footing with number of papers published and grants obtained," notes Davidse.

Today, 153 years after opening, the Missouri Botanical Garden is a National Historic Landmark and a center for science, conservation, education and horticultural display. With scientists working in 35 countries on six continents around the globe, the Missouri [Botanical Garden](#) has one of the three largest plant science programs in the world and a mission "to discover and share knowledge about [plants](#) and their environment in order to preserve and enrich life."

Provided by Missouri Botanical Garden

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