New daisy species discovered with refined DNA technology

November 13 2024, by Olof Lönnehed

Stoebe daisy bushes included in the study on a mountain slope near Villiersdorp in the Western Province of South Africa. Credit: Zaynab Shaik

Sometimes plants are so similar to each other that the methods developed by 18th-century scientist Carl Linnaeus for identifying species are not enough. In a thesis from the University of Gothenburg, completely new species of daisies have been discovered when analyzed using modern DNA technology.

There are currently estimated to be about 8.7 million different species on Earth, of which about 2.2 million are found in the oceans. Many species can be identified in the classical way, by their physical

characteristics, their morphology.

For more than a decade, botanists and zoologists have also been using DNA sequencing to more accurately identify species. So far, scientists have selected a single site in the DNA that is typical of the species, but this sometimes risks being wrong.

"There are times when different plant species are difficult to characterize from a small DNA sequence. But now DNA sequencing has taken several steps forward and we have been able to identify completely new species by analyzing a larger part of the genome," says Zaynab Shaik, author of a doctoral thesis at the University of Gothenburg.

Daisies in South Africa

Shaik's focused on a group of 66 accepted species of daisies, growing in the Cape Province of her native South Africa. The daisies are well known, with the first species described in 1753, but there is a group of daisies in the area that have been difficult for botanists to identify. The plants are "cryptic," they look identical, with similar leaves and flowers, and have the same growth habit and similar distribution. Yet they differ significantly genetically.

"It is important that we have a better understanding of plant relationships and biodiversity on Earth. It is easy to imagine how wrong it could be if we discover that a plant is suitable for use as a base in a drug, and then we pick another, similar, species instead, which may not have the same properties at all," says Shaik.

Mistaken for other species

Zaynab's DNA analyses of these cryptic species have resulted in the

discovery of four new species.

"When I'm asked about this, there's a bit of an anti-climax when I explain that it's not that I've found a new daisy in a remote location that no one has seen before. But these have been admired for a long time, but they have been mistaken for another species."

The method Shaik uses to identify species is called integrative taxonomy. It involves supplementing traditional observations of plant appearance and growth habit with DNA sequencing in a laboratory. Together, these methods provide a better understanding of the boundaries between different species. Scientists using this method will discover new species at a higher rate than previously expected.

"In the Cape, it has been thought that only 1% of biodiversity remains to be discovered. My results suggest that it could be much more than that. And the same should reasonably apply to other areas of the globe," says Shaik.

More information: Extensions of the Multispecies Coalescent in Bayesian Phylogenetics: A Study of the Southern African-centred Stoebe Clade (Gnaphalieae: Asteraceae). gupea.ub.gu.se/handle/2077/82775

Provided by University of Gothenburg

Citation: New daisy species discovered with refined DNA technology (2024, November 13) retrieved 27 January 2025 from https://phys.org/news/2024-11-daisy-species-refined-dna-technology.html