Amateur botanists in Brazil discover a genuflexing plant

September 14 2011

Fruiting branches bending down to release seeds from capsules. Credit: Alex Popovkin

José Carlos Mendes Santos (a.k.a. Louro) is a handyman in rural northeastern Bahia, Brazil - one of the areas of the world with the highest biodiversity. Two years ago, he found a tiny, inch-high plant with white-and-pink flowers in the backyards of the off-the-grid house of amateur botanist and local plant collector Alex Popovkin. The little plant was brought home to be grown on a window sill for closer observation. In parallel, work on its identification began. Thanks to solar power and a satellite connection, Popovkin had access to the Internet, and as was his habit, he uploaded some photographs of the plant to Flickr and contacted several taxonomic experts around the globe. The family (strychnine family, or Loganiaceae) and genus (Spigelia) of the plant were soon established, with a suggestion from a Brazilian botanist that it might be a new species.

A collaboration was started with Lena Struwe, a specialist of the plant's family at Rutgers University, who had previously described a species in the gentian family from the Andes named after Harry Potter (apparating moon-gentian, Macrocarpaea apparata), and another after the Inca tribe (the Inca ring-gentian, Symbolanthus incaicus). More collections were made, photographs uploaded and specimens deposited at the State University at Feira de Santana (HUEFS) in Bahia, while Mari Carmen Molina, a visiting scientist in Struwe's lab from Spain, extracted the plant's DNA. In collaboration with Katherine Mathews from Western Carolina University, it was confirmed that the genus was indeed Spigelia, to which pinkroot, an old North American herbal remedy against intestinal parasites, also belongs.

A very tiny, tiny flowering plant Credit: Alex Popovkin

Only a few miniscule plants were found in the field the first year. They would die each dry season, only to reappear again at the beginning of the rain season. The plant growing on the window sill soon showed a particular and rare characteristic: after fruits were formed, the fruiting branches would bend down, depositing the capsules with seeds on the ground (and sometimes burying them in the soft cover of moss), thereby ensuring that the seeds would end up as close to the mother plant as possible, facilitating its propagation the following season. This

phenomenon, called geocarpy, is a rare adaptation to growing in harsh or ephemeral environments. A famous example of geocarpy is the well-known peanut from the legume family that buries its fruits in the ground. The new species, appropriately named *Spigelia genuflexa*, is described in an open-access paper published this week by the five collaborators in the taxonomic journal *PhytoKeys*, from where the article can be downloaded for free.

Mr. Popovkin: This is my first botanical publication in a peer-reviewed journal. Hopefully, there will be more to follow. I had since early adolescence felt attraction to plants, especially tropical plants, when working as a volunteer at the greenhouses of the Botanic Garden of the University of St Petersburg, Russia. It took me 30 years to realize my dream of living in the tropics and studying its plants up close. My daily botanizing walks always bring personal discoveries. My help and local fellow collector Louro has also shown great interest in botany.

Flowers of Spigelia genuflexa Credit: Alex Popovkin

"It is very easy to think we have found and described most plant species of the world already, but this discovery shows that there are so much left out there without name and recognition", says Struwe and adds, "This discovery shows that the most amazing living things can be found when

you least expect it, during times and places when you really aren't looking for something new, and suddenly it is right there in front of you. How many of us haven't had the most brilliant ideas in the shower? The art of taxonomy is finding as well as being able to recognize something as new or different, which is hard when the world is home to millions of species and very few species experts."

This case shows that collaboration between amateurs and professional scientists, using both new molecular and traditional methods and making use of the facilities of the Internet can lead to new discoveries and new efficient ways of documenting the world's biodiversity.

More information: Popovkin AV, Mathews KG, Santos JCM, Molina MC, Struwe L (2011) Spigelia genuflexa (Loganiaceae), a new geocarpic species from the Atlantic forest of northeastern Bahia, Brazil. *PhytoKeys* 6: 47-65. doi: 10.3897/phytokeys.6.1654

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