Barcoding facilitates Brazilian earthworm taxonomy

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The Cytochrome Oxidase 1 (COI) barcode region has been shown to be very effective for earthworms, allowing species-level identification of adults, juveniles and cocoons, for which the latter two are generally impossible morphologically. While the barcode sequence itself is not sufficient for robust phylogenetic tree generation, it is a valuable tool for preliminary species delineation, detection of cryptic species, and estimation of biodiversity. Therefore earthworms were chosen for inclusion in both the iBOL and BR-BOL projects, the latter of which now contains barcodes for ~400 earthworms from 112 sites, mainly in Southern Brazil. In total, we estimate that barcodes have been generated for approx. 150 species, most of them new to science. In S and SE Brazil, approximately 56 species-level lineages of *Glossoscolex* and *Fimoscolex* were found, most of which belonged to undescribed species. The neighbor joining tree of these sequences shows geographical structure within each genus, sometimes on very small spatial scales. Barcoding has helped to separate morphologically similar species, species with more complicated taxonomy and show geographic variation within species. We found that *Urobenus brasiliensis* Benham, 1886 a very widely distributed species, is probably a complex of >10 morphologically very similar, but genetically distinct lineages qualifying as cryptic species. While there are still restrictions to the extensive use of barcodes for identifying of Brazilian species, we still expect that a comprehensive database can be a powerful taxonomic tool that merits further development.

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