

Towards new insights in the phylogeny of the Spermacoce clade: an integrative taxonomic approach using morphology, anatomy, ecology and phylogenetics reveals the new genus *Leonoria*

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Phylogenetic inference analyses of two nuclear and four plastid DNA markers from 82 accessions representing 19 genera of the *Spermacoce* clade (Spermacoceae-Rubiaceae) confirm that the Brazilian genus *Denscantia* is biphyletic. By the analyses of reproductive morphological characters, foliar morpho-anatomy and histochemical, geographical distribution ranges, and ecological niche derived from climatic space, *Denscantia calcicola* is shown as a distinct lineage from the other *Denscantia* species, indicating its taxonomic segregation into a new monospecific genus *Leonoria*. Significant morphological differences of *Leonoria* with *Denscantia* were found in inflorescence organization, stigma shape, fruit dehiscence, and pollen morphology. Morpho-anatomical variation among leaf traits were found in epidermal cells, occurrence of trichomes, mesophyll histochemical, and vascular organization. Analysis of occurrence records of 205 specimens demonstrates a clear ecological distinction between of *Denscantia* s.s. and *Leonoria*, which is ecologically confined to limestone outcrops associated with seasonally dry forests. The current study demonstrates the importance of an integrative taxonomic approach - in which multiple disciplines are combined - to the unravel complex taxonomic patterns within Rubiaceae. The genus *Leonoria*, to be newly described, is dedicated to Professor Elsa Leonor Cabral.