**Taxonomy and evolutionary relationships between the species of *Palicourea* s.l. (Rubiaceae) in the Atlantic Forest**

**Introduction**

The genus *Palicourea* is the most important in number of species of Rubiaceae family. This genus is composed of shrubs and small trees, occurring in the New World tropics. Molecular studies have shown that most of the species that formerly belonged to *Psychotria* subg. *Heteropsychotria* Steyerm. should be transferred to the *Palicourea* s.l. (Andersson 2002; Nepokroeff et al. 1999; Razafimandimbison et al. 2014). Phylogenies have proved to be crucial in taxonomy and systematics of species of Palicoureeae and Psychotrieae tribes. Taxonomic studies were carried out treating some species of the Brazilian flora. One can cite as an example Taylor (2015) studying *Palicourea* sect. *Tricephalium*, Taylor and Hollowell (2016) studying *Palicourea* sect. *Nonatelia*; Taylor and Jardim (2018) studying *Palicourea* from the Atlantic Forest of Eastern Brazil.

However, the amount of currently known species of this group is underestimated. Fieldwork conducted by me in the Atlantic Forest and herbarium identification routine has evidenced many collections unidentified and possibly new species belonging of this genus. Indeed, the plant collection identification in herbarium revealed many misidentified collections. Delprete & Jardim (2012) signalled the high potential for the discovery of new species of Rubiaceae, which is evidenced by the high number of species described in the last years (Bruniera et al. 2015; Salas et al. 2015; Torres-Leite et al. 2016; Torres-Leite et al. 2018). The focus of this study is in the sections *Condonocalyx*, *Solenocalyx* and *Suteria*, as is a group with some nomenclatural problems and especially in species delimitation. Recently, these sections had some of their species studied in local floristic works, such as Delprete et al. (2005) studying the flora of Santa Catarina, and Taylor (2007) studying the flora of the São Paulo state. A preliminary analysis made in this work already discovery five new species for the three sections in study and others are under investigation. In this way, it will be possible to integrate all this information about the *Palicourea* of the Atlantic Forest, which will contribute significantly to the Taxonomy and Systematics of the genus and Rubiaceae as a whole.

The phylogenies already performed for Rubiaceae, in general (except Bruniera 2015), do not include many representatives of the Atlantic Forest. Therefore, we have strived to include as many representatives of the tribe Palicoureeae and especially of the genus *Palicourea* s.l. from this biome, with the goal of clarify the relations between these and other sections of the group. The results obtained with these groups of species within *Palicourea* s.l. can help in the progress of future taxonomic works.

**Objectives**

The objective of the present proposal is to expand the taxonomic and evolutionary knowledge of Rubiaceae in the Atlantic Forest from the study of *Condonocalyx*, *Solenocalyx* and *Suteria* sections. Our hypothesis is that these species belong to a single section and not three different sections as previously treated.

**Material and methods**

For the accomplishment of this study, the phylogeny will be based on molecular data, which will use the three cpDNA regions, plus the nuclear region ITS. For the phylogenetic analyses the nucleotide sequences will be used that will be generated from material collected in the field or in the herbaria. All generated sequences will be deposited on the GenBank platform. The trees will be rooted separately with the species of each section studied (Condonocalyx, Solenocalyx and Suteria) and together. Sequences of taxa from other sections of the tribes Psychotrieae and Palicoureeae will be included as an in-group an group. Taxa of other genera will be used as outgroups. Some morphological characters will be selected for an evolutionary analysis in the group aiming at the identification of possible morphological synapomorphies to delimit the infrageneric groups. The synopsis will be carried out with the study of collections from Brazilian and in material collected in the field. Brazilian herbarium that has a large collection of *Palicourea* s.l. For this reason, the study this material is fundamental to the morphological study of the species. The necessity of this project is justified by the absence of a phylogenetic analysis including a wider sampling of species of *Palicourea* s.l. of the Atlantic Forest.

The sections *Condonocalyx*, *Solenocalyx* and *Suteria* are endemic to the Brazilian Atlantic Forest, occurring from the south of Bahia to Rio Grande do Sul. In order to treat the representatives of these sections in their totality, it is necessary to carry out fieldworks in the states of the Southeast, South and Northeast. Here we highlight the importance of visits to more distant locations such as the states of Bahia, Minas Gerais, Paraná, Rio Grande do Sul and Santa Catarina, which have not yet visited. These states present occurrences of endemic taxa with few records in herbarium collections. From the selection of localities, the selected herbaria will be visited for analysis of the collections. Here we can highlight ALCB, CEPEC, ECT, FLOR, FURB, HUCS, HUESC, ICN, MBM UPCB and VIC.

A taxonomic review will be carried out on monophyletic lineages. Each existing binomial related to the taxa of the sections will be analysed. The binomials will be obtained from the main studies provided for the genus Psychotria and *Palicourea* (Schumann 1889; Delprete, Smith & Klein 2005; Taylor 2007). The species will have their morphology and diagnostic characters described and illustrated.

**Relevant information**

This project received one grants for a visit to the MO, for to analyze part of the *Palicourea* collection housed in this important herbarium. The IAPT funding will be applied for the important herbarium visits in some Brazilian states as Bahia (ALCB, CEPEC, UESC), Minas Gerais (BHCB, VIC), Paraná (MBM, UPCB), Rio Grande do Sul (HUCS, ICN) and Santa Catarina (FLOR FURB). Visits to these herbaria will be extremely important for completion of the analysis of collections of *Palicourea* species of the sections focus of this project.

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