There and back again: molecular phylogenetics of the Brazilian endemic *Psyllocarpus* (Rubiaceae: Spermacoceae) supports a circumscription of the genus based on its original concept

Carmo J.A.M.1*, Reginato M.2, Sobrado S.V.1,3, Miguel L.M.1,3, Janssens S.B.4,6, Dessein S.4, Salas R.M.1,3 & Simões A.O.5

1Instituto de Botánica del Nordeste, UNNE – CONICET, Corrientes, Argentina. 2Departamento de Botánica, Instituto de Biociencias, Universidade Federal do Rio Grande do Sul, Porto Alegre, RS, Brazil. 3Facultad de Ciencias Exactas y Naturales y Agrimensura, FaCENA – UNNE, Corrientes, Argentina. 4Meise Botanic Garden, Meise, Belgium. 5Departamento de Biologia Vegetal, Instituto de Biologia, Universidade Estadual de Campinas – UNICAMP, Campinas, SP, Brazil. 6Leuven Plant Institute, Department of Biology, KU Leuven, Leuven, Belgium.

*Presenting author: Carmo J.A.M. E-mail: jmartinslocarmo@gmail.com

The *Spermacoce* clade (tribe Spermacoceae) is one of the most taxonomically complex groups in Rubiaceae due to the unclear delimitation of *Borreria* and *Spermacoce*, in which several smaller genera are phylogenetically intermingled. One of these genera is the Brazilian endemic *Psyllocarpus*, whose circumscription was broadened, thereby including two sections. *Psyllocarpus* sect. *Psyllocarpus*, being based on the original genus delineation, includes nine species, distributed in the Cerrado and campo rupestre of eastern Brazil, whereas *P.* sect. *Amazonica* comprises three species, occurring in the Amazonian campinas. Furthermore, *P. intermedius* was not classified in any of these sections when it was later described. In order to test the monophyly of *Psyllocarpus* and assess its relationships to other genera, we conducted phylogenetic analyses, sampling across the whole *Spermacoce* clade, including nearly all *Psyllocarpus* species. A combined nuclear ribosomal (ETS and ITS) and plastid (*rps16* and *trnL-trnF*) dataset was generated, representing 124 species (ca 25% of the species in the clade) in 15 genera (ca 65%). Various methodologies were applied to investigate the degree of incongruence among markers and address the lack of resolution and low support values for some branches. Our results revealed that *Psyllocarpus* is not monophyletic. *Psyllocarpus campinorum* (from *P.* sect. *Amazonica*) and *P. intermedius* are situated as distinct lineages in the *Spermacoce* clade, yet do not belong to *Psyllocarpus*. Members of section *Psyllocarpus* form a strongly supported clade sister to *Staelia* and was recovered with high to maximum support across different datasets and inference methods. Therefore, *Psyllocarpus* has to be circumscribed based on its original concept, excluding *P.* sect. *Amazonica* and *P. intermedius*. This establishes the genus as a monophyletic and easily diagnosable taxon, characterized by terete leaves, homostyloous flowers, a bilobate calyx, included stamens and style, and compressed, septifragally dehiscent capsules with a persistent septum.