

PROPOSAL FOR THE IAPT RESEARCH GRANT AWARD 2020

GENERAL INFORMATION

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HIGHEST ACADEMIC DEGREE: Masters in biological sciences

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COUNTRY: Brazil

PROJECT DETAILS

TITLE OF PROPOSED PROJECT: Taxonomic Review of Neotropical *Mendoncia* Vell. ex Vand. (Thunbergioideae, Acanthaceae)

SUMMARY: The neotropical collections of *Mendoncia* in herbaria need a large amount of work as few species are determined, while the proliferation of names has created a large synonymy that has not been systematically updated in South American herbaria, therefore the present project aims to obtain funds to revise these specimens.

TOTAL AMOUNT REQUESTED: \$2000 US

SUPERVISOR: Dr. Daniela Cristina Zappi

CO-SUPERVISORS: Dr. Cíntia Kameyama and Dr. André dos Santos Bragança Gil

SUPPORTING INFORMATION

LIST OF UP TO FOUR RELEVANT PUBLICATIONS:

- (1) Silva, F.A.; Bonadeu, F. Acanthaceae em Colorado do Oeste, Rondônia, Brasil. *Rodriguesia* 70: 1-13. 2019.
- (2) Silva, F.A.; Gil, A.S.B.; Kameyama, C. *Justicia carajensis*, a new species of Acanthaceae from the Serra dos Carajás, Pará, Brazil. *Phytotaxa* 388: 266-274. 2019.
- (3) Silva, F.A.; Gil, A.S.B.; Reis, A.S.; Fernandes Junior, A.J.; Luz, C.F.P.; Kameyama, C. Three New Species of *Justicia* L. (Acanthaceae) from Brazil. *Systematic botany* 44: 697-707. 2019.
- (4) BFG - The Brazil Flora Group; Silva, F.A. Brazilian Flora 2020: Innovation and collaboration to meet Target 1 of the Global Strategy for Plant Conservation (GSPC). *Rodriguesia* 69: 1513-1527. 2018.

PEOPLE WHO HAVE PROVIDED RECOMMENDATION LETTERS:

Dr. Daniela Cristina Zappi (danielazappi14@gmail.com)

Dr. Cíntia Kameyama (ckameyama@ibot.sp.gov.br).

PROJECT PROPOSAL

TAXONOMIC REVIEW OF NEOTROPICAL *MENDONCIA* VELL. EX VAND. (THUNBERGIOIDEAE, ACANTHACEAE)

INTRODUCTION

Acanthaceae Juss. is a family of Asterid eudicots represented by herbs, shrubs, lianas and rarely trees. Recognized by their opposite, simple, exstipulate leaves with calcium carbonate cystoliths. The flowers often count with showy protective bracts and the fused corolla is oligostemonous and zygomorphic. The chief economic importance of this family is the cultivation as ornamentals and the medicinal use. With pantropical distribution and few temperate representatives, Acanthaceae comprises 240 genera and c. 3.250 species (Wasshausen and Wood 2004).

Located in order Lamiales Bromhead, the Acanthaceae is subdivided into four subfamilies: Thunbergioideae Kostel, Acanthoideae Link, Nelsonioideae Pfeiff and Avicennioideae Miers (APG IV 2016). Thunbergioideae is the second largest subfamily, comprising c. 195 species distributed in five genera. *Mendoncia* Vell. ex Vand. is the second largest of the subfamily, with around 90 species of voluble lianas with a pair of well developed bracteoles that partly cover the generally red corolla, reduced calyx and drupaceous fruits (Figure 1).

Mendoncia has a transatlantic disjunction, and it is supported as monophyletic, as well as the neotropical species (Borg et al. 2008). The neotropical region is the most diverse in terms of species numbers (c. 80) (Magnaghi and Daniel 2017). The genus is found from southeastern Mexico to Brazil and Bolivia, inhabiting mostly humid forests, and with the Amazon as the largest diversity centre for the genus, with around 50 accepted species.

The last complete revision of the genus has been published a century ago (Turrill 1919), comprising only 25 accepted species and, despite of its consistent descriptions, the identification key, typifications and diagnostic comments present incongruous or sketchy evidence. When considering the total number of accepted

species today, this treatment deals with only 27% of the taxa. Turrill (1919) excludes one name and deems seven names described by Nees (1847) as dubious without explaining his reasons. Recently, Magnaghi and Daniel (2017) revised paleotropical species and treated 10 African and Madagascan species. General floras have included *Mendoncia* species in the neotropical region, such as Colombia (Leonard 1951), Guianas (Wasshausen 2006) and Ecuador (Wasshausen 2013), and revisions for Peru (Leonard 1931) and Brasil (Profice 1988). Despite of the relatively large number of treatments, a revision focusing on all neotropical species has not been attempted and is justified as the herbarium collections have few identifications and several instances of confusion that will be elucidated through this study. A quick scan of the collections available online have shown many *incertae sedis* specimens, synonymy and typification not fully explained or unclearly justified, species delimitation problems and few recent collections deposited in Amazonian herbaria.

OBJECTIVES

The main objective of this project is to develop a taxonomic revision of genus *Mendoncia*, establishing new circumscriptions and interspecific limits between the accepted taxa, synonymy and typification of neotropical species, contribution towards the understanding of the species diversity of the genus. The specific objectives are to: (a) increase and improve the available herbarium collections through field expeditions and thorough determination of the extant collections; (b) recognize new morphological characters that help to identify and circumscribe the studied taxa; (c) prepare detailed descriptions, identification keys, illustrations and distribution maps for the neotropical species of *Mendoncia*; (d) prepare conservation assessments of the recognized taxa with basis on the criteria and categories of IUCN (2012; 2017); (e) contribute to the Flora do Brasil 2020 project by adding descriptions, identification keys and illustrations for all *Mendoncia* species recorded for Brazil.

MATERIAL AND METHODS

The questions posed in the objectives will be answered through the following phases: (a) Analysis of *Mendoncia* specimens from the main Brazilian, South American and North American herbaria in order to form a species concept and find morphological characters that aid in the differentiation of the taxonomic entities recognized; (b) concomitant field expeditions to all environments where *Mendoncia* is found, concentrated in Brazil; (c) Further search for characters, now anatomical and palynological that will help to provide support to the taxonomic entities recognized within *Mendoncia* and (d) typification of available names (accepted and synonymous) for the recognized entities and proposition of lectotypes when necessary.

PRELIMINARY RESULTS

The first 10 months of this study have been utilized to finish the required courses (90% finished) and to carry out four field expeditions that have led to the collection of seven species, approximately half the number of known species for Brazil, deposited at MG with duplicates to be sent to SP and RB. All specimens currently deposited at MG, INPA and IAN were analysed and databased, amassing a total of 448 examined herbarium specimens.

PROJECT SIGNIFICANCE

The scientific contribution of this project will be to solve a considerable taxonomic problem from one of the largest families of Lamiales. *Mendoncia* species are chiefly distributed in the Amazon Rainforest, a biome



Figure 1 - Representatives of *Mendoncia* and its morphological diversity.

with the largest tropical forest in the world and still considered to pose a significant challenge in terms of the botanical knowledge. To study the biodiversity of this challenging environment is most important if we are to improve our understanding and to better conserve the forest.

Intense environmental degradation and deforestation are coupled by increasing land occupation. *Mendoncia* species are so insufficiently known at the moment that the data we have are not enough to perform conservation assessments, let alone to propose conservation plans for these taxa. The present project will systematically collate the necessary distribution data in order to prepare the conservation assessments.

From the socioeconomic viewpoint there is potential within this project to investigate potential uses of *Mendoncia* either as traditional medicines or ornamental plants.

BUDGET AND JUSTIFICATION

F.A. Silva holds a CAPES grant to carry out his PhD thesis (yearly value US \$ 6200). A grant from IAPT would be extremely welcome in order to cover additional costs related to visiting important Brazilian herbaria (RB, R, SPF and SP). While in SP, it will be possible to consult with the co-supervisor, Cíntia Kameyama, specialist in Brazilian Acanthaceae. With the knowledge that the majority of newly described species of *Mendoncia* in the Neotropical region has been performed based on collections from Colombia and Ecuador, it will be very important to gain access to the following collections in these countries: ANDES, BOG, CAUP, COAH, COL, FMB, HPUJ, ICA, JBB, UDBC, ECUAMZ, LOJA, HUTPL and CHEP, where the majority of the nomenclatural types are deposited. The careful study of these collections, coupled with the possibility to visit at least some plant locations, will provide invaluable insight over the extra-Brazilian species and to complete the dataset that is been built for the present project.

The overall budget for this IAPT proposal is presented below:

Items	Description	Value
Airplane tickets	Belém (PA/BR) – Rio de Janeiro (RJ/BR)	US \$ 235.00
	Belém (PA/BR) – São Paulo (SP/BR)	US \$ 140.00
	Belém (PA/BR) – Bogotá (BOG/COL)	US \$ 575.00
	Bogotá (BOG/COL) – Quito (UIO/EQ)	US \$ 300.00
Daily expenses	25 days/US \$30 (per day)	US \$ 750.00
Total		US \$ 2000.00

LITERATURE CITED

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- Wasshausen, D.C. Acanthaceae. In Persson, C. and Ståhl, B. (Eds.). *Flora of Ecuador* 89. Department of Biological and Environmental Sciences, University of Gothenburg, Sweden. 2013. p. 1–328.