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Original article

The Amherstieae tribe (Leguminosae – Detarioideae) in the IAN Herbarium of Embrapa Eastern Amazon, Belém, Brazil

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ABSTRACT: Herbaria are significantly relevant to science; updating and computerizing their data is essential for conducting future research. The IAN Herbarium (Embrapa Eastern Amazon) has an extensive collection of Leguminosae Juss., which was classically divided into three subfamilies; however, in 2017, a review was published proposing a new classification, dividing it into six subfamilies, among them Detarioideae. In 2018, Detarioideae was divided into six tribes, the largest of them Amherstieae. This large taxonomic recircumscription justifies a database update. The objective of the study was to carry out the survey, organization, computerization, and online availability of representatives of the tribe Amherstieae (Leguminosae – Detarioideae) at the IAN Herbarium. First, a survey was carried out on which genera of Amherstieae were represented in the collection. Their specimens were located and had their information inserted in the database and subject to quali-quantitative analyses. 976 specimens belonging to 10 of the 50 genera of Amherstieae were observed. The genus with the most specimens (600) was *Macrolobium.* The samples had origins in 9 countries, with 885 from Brazil, and from these, 438 from Pará, with 54 municipalities represented. The distribution of collections by mesoregions showed great heterogeneity with a concentration in Northeastern Pará and the Metropolitan Region of Belém. In conclusion, it is of fundamental importance that the Amherstieae data are disseminated, contributing to a greater offer of information regarding this group. Therefore, their data were included in the IAN Virtual Herbarium in January/2019, which can be consulted online from anywhere in the world, assisting in future research.

Keywords: Amazon rainforest, Biodiversity, Botanical collections, Data computerization, Legumes.

RESUMO (A tribo Amherstieae (Leguminosae – Detarioideae) no Herbário IAN da Embrapa Amazônia Oriental, Belém, Brasil): Os herbários são de grande relevância para a ciência; atualizá-los e informatizá-los é imprescindível para a realização de pesquisas. O Herbário IAN (Embrapa Amazônia Oriental) possui uma extensa coleção de Leguminosae Juss., que possuía divisão clássica em três subfamílias; todavia, em 2017, foi publicada uma revisão propondo uma nova classificação, dividindo-a em seis subfamílias, entre elas Detarioideae. A essa última, em 2018, foi proposta circunscrição em seis tribos, sendo a maior delas Amherstieae. Esta grande recircunscrição taxonômica justifica a atualização do banco de dados. O objetivo do estudo foi realizar o levantamento, organizar, informatizar e disponibilizar *online* os representantes da tribo Amherstieae (Leguminosae – Detarioideae) no Herbário IAN. Primeiramente, foi realizado levantamento de quais gêneros da tribo estavam representados no acervo. Suas exsicatas foram localizadas, tendo suas informações inseridas no banco de dados, posteriormente sendo objeto de análises qualiquantitativas. Observou-se 976 amostras pertencentes a 10 dos 50 gêneros de Amherstieae. O gênero com mais amostras (600) foi *Macrolobium.* As amostras tiveram origem em 9 países, sendo 885 do Brasil, e dessas, 438 do Pará, com 54 municípios paraenses representados. A distribuição das coletas por mesorregiões paraenses mostrou grande heterogeneidade com concentração no Nordeste Paraense e Região Metropolitana de Belém. Conclui-se que é de fundamental importância que os dados de Amherstieae sejam divulgados, contribuindo para maior oferta de informação deste grupo. Portanto, os dados da tribo foram incluídos no Herbário Virtual IAN em janeiro/2019, podendo então ser consultados *online* de qualquer lugar do mundo e auxiliando em futuras pesquisas.

Palavras-chave: Biodiversidade, Coleções botânicas, Floresta Amazônica, Informatização de dados, Leguminosas.

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INTRODUCTION

Herbaria are of great importance as centers for the identification of plant species and are thus defined as "reference collections containing documented and preserved plant specimens" (Mania & Assis 2008, p. 4). They are of great relevance to research in taxonomy, floristics, ecology, etc, supporting studies in these and other fields (Pacheco 2004).

Updating and computerizing these collections is extremely important so that the data and information contained in these sites can be used and disseminated more quickly and efficiently; therefore, computerization is necessary not only for collection management purposes but also for this data to be easily available and accessed online (Mania & Assis 2008).

In this context, the IAN Herbarium of Embrapa Eastern Amazon has an extensive collection of specimens from the botanical family Leguminosae Juss., which recently suffered a large and consistent taxonomic recircumscription among the elements of its subfamilies (LPWG 2017), which justifies an update on its database based on these new studies.

This family is the third-largest among Angiosperms, having great economic and ecological importance and being recognized with approximately 730 genera and 19,400 species; it includes several important species, such as medicinal, ornamental, cultural, and timber plants. In addition, it is present in great diversity in all major vegetation types of the tropics, including the Amazon (LPWG 2013, Yahara *et al.* 2013, LPWG 2017).

Leguminosae had a classic and widely accepted division into three subfamilies, first proposed by Candolle (1825): Mimosoideae, Papilionoideae, and Caesalpinioideae. Another widely used classification was the Cronquist system (Cronquist 1981), in which legumes were divided into 3 families: Mimosaceae, Caesalpiniaeae, and Fabaceae. However, the three Candolle subfamilies remained the most used system by far.

Caesalpinioideae was made up of 180 genera and 2,250 species and divided into four tribes: Cercideae, Detarieae, Cassieae and Caesalpinieae (Lewis *et al.* 2005). However, it was recognized as a non-monophyletic group, leading to the need for a new classification (LPWG 2017). Therefore, in 2017, The Legume Phylogeny Working Group (LPWG) published a review proposing a new classification of Leguminosae based on molecular data and phylogenetic studies, dividing it into six subfamilies: Papilionoideae, Caesalpinioideae, Duparquetioideae, Dialioideae, Cercidoideae, and Detarioideae, also providing morphological descriptions for the subfamilies (LPWG 2017). The following year, a new study was published which proposed a tribal division for the new subfamily Detarioideae, based on molecular data, in six tribes: Afzelieae Estrella, L.P. Queiroz & Bruneau, Schotieae Estrella, L.P. Queiroz & Bruneau, Barnebydendreae Estrella, L.P. Queiroz & Bruneau, Saraceae Estrella, L.P. Queiroz & Bruneau, Detarieae DC., and Amherstieae Benth. (Estrella *et al*. 2018).

Among the six tribes proposed by Estrella *et al*. (2018), Amherstieae has the most genera, with 50. It also has economically, ecologically, and culturally relevant species, such as some of those belonging to the genera *Amherstia* Wall., *Macrolobium* Schreb., *Brownea* Jacq., *Tamarindus* L., *Dicymbe* Spruce ex Benth., among others (Sousa *et al*. 2010, LPWG 2013, FEITOZA *et al*. 2014, SMITH *et al*. 2017).

The IAN Herbarium collection remains organized according to the old classification of Leguminosae into three subfamilies. Thus, an update of the collection of the Amherstieae tribe at IAN was

necessary. This update and the consequent availability of such information on the Institution's website through computerization will assist in the dissemination of this data and the identification of new and existing taxa belonging to the tribe.

Thus, the general objective was to carry out the survey, organization, computerization, and online availability of representatives of the Amherstieae (Leguminosae - Detarioideae) tribe in the IAN Herbarium of Embrapa Eastern Amazon. The specific objectives were a) to search for Amherstieae specimens and their associated data in the IAN Herbarium collection; b) to analyze quali-quantitative data from the Amherstieae collection (number of specimens by genus and species, contribution of specimen collectors, and place of collection), organizing and computerizing them in the herbarium database; and c) to make the data available online at the IAN Virtual Herbarium.

MATERIAL AND METHODS

Study site

The study was carried out in the Herbarium of the Botany Laboratory of Embrapa Eastern Amazon (Figure 1a), Belém, Brazil, indexed with the acronym IAN according to Thiers (2022).

The herbarium (Figure 1b) was created in 1945 by botanists João Murça Pires and William Archer at the former Northern Agronomic Institute (IAN); today it is formed by the collection of specimens and also associated collections of wood, flowers, fruits, seeds, and seedlings, as well as an extensive collection of photographs and nomenclatural types (Martins-da-Silva *et al*. 2015). There are currently more than 197,000 specimens in the IAN collection (Souza *et al*., 2015).

Figure 1. Overview of the Botany Laboratory building at Embrapa Eastern Amazon. a. Entrance facade of the building and lateral view of the Herbarium; b. The main entrance of the Herbarium and the cabinets where the specimens are stored (Authors, 2021).

Specimen survey

First, based on the complete list of genera that make up the Amherstieae tribe, described by Estrella *et al*. (2018), a survey was carried out to find out which of these genera were present in the IAN Herbarium collection. This survey was performed with the aid of the BRAHMS software (BRAHMS, 2019), used to organize the IAN database. The necessary information was extracted in a separate file called RDE (Rapid Data Entry) from the main database of the herbarium. This file was later exported to Microsoft Office Excel for better editing, containing a list of all Amherstieae specimens registered in the IAN Herbarium database, as well as information associated with them.

After obtaining this file, it was possible to make a new list only with the genera of Amherstieae present in the IAN collection. This information served as the basis for searching the respective specimens in the collection cabinets.

Organization and computerization

After listing all of the genera and species of Amherstieae present in the IAN collection, the specimens were located in the collection cabinets. However, it was noticed that some old material had never been computerized, therefore not all specimens found in the cabinets were registered in the herbarium database (BRAHMS). Thus, botanical data information was entered into the BRAHMS database in two different ways:

a) using the BRAHMS main module in the case of specimens already registered in the database;

b) using the RDE module in the case of specimens that were not registered yet to import them into the database.

The information that was entered in the database is the one contained in the labels of the specimens, such as genus and species of the collected material, name of the collector, collection number, place and date of collection, notes on the plant, and habitat where it was found, etc, with each specimen being assigned an individual number of 6 digits - their number in the IAN collection – and a respective barcode. When necessary, taxon spelling corrections were made using tools such as Tropicos (http://www.tropicos.org/), The Plant List (http://www.theplantlist.org/) and Flora do Brasil 2020 (http://floradobrasil.jbrj.gov.br/).

Entering this information into the BRAHMS database was useful to support qualitative and quantitative analysis of the collected specimens. Thus, it was possible to analyze the number of samples collected by genus and species, the collectors that contributed the most to the tribe's collection in the IAN Herbarium, and the places where most of the collections were performed. This information was then used to produce tables, graphs, and maps.

After that, images of each of the specimens and their respective labels were obtained at 200 dpi resolution (600 dpi for nomenclatural types) with the aid of the EPSON J181A high-resolution scanner (Figure 2a). However, certain specimens contained fruits, seeds, or other large materials that could not have their images taken from the scanner; in these cases, a photographic station with the CANON EOS6D camera (Figure 2b) was used, intended for capturing images of bulky material.

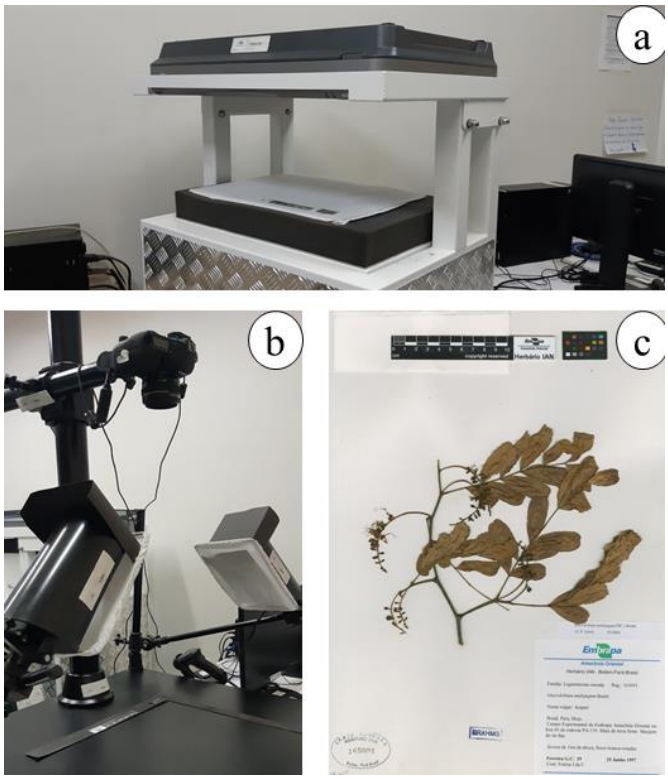

Figure 2. a. High-resolution scanner; b. Photographic station; c. Scanned specimen of *Macrolobium multijugum* (DC.) Benth., register number IAN165091 (Authors, 2021).

In every scanned or photographed specimen (Figure 2c), two scales are placed for reference: a color scale and a length scale. It is noteworthy that the camera is always used with macro and flash settings, resulting in images with better focus and brightness. The images obtained are then saved and renamed according to the IAN Herbarium standards.

Online availability

The IAN Herbarium's database is stored in a tower server located in the Informatics Sector of Embrapa Eastern Amazon; all the information about the collection available in the virtual herbarium comes from this database.

To send all this data and images to the server, a BRAHMS component called Brahmswebconnect was used. This component is responsible for searching and converting the information from the herbarium database to create the finished product, which is the IAN Virtual Herbarium website (http://brahms.cpatu.embrapa.br/).

Before images are made available on the website, they are processed by the Zoomifyer Enterprise Connect software, resulting in higher quality pictures so that the material can be viewed in detail and without any problems.

RESULTS AND DISCUSSION

In the IAN Herbarium, until the present study, it was verified that the database had records of 25,648 samples belonging to the Leguminosae family and 2,667 belonging to the Detarioideae subfamily. According to the survey conducted in the collection, 10 genera of Amherstieae (Table 1) were found at IAN from a total of 50 genera indicated by Estrella *et al*. (2018).

Before the tribe's computerization, when searching these genera in the BRAHMS database, there were records of 950 specimens belonging to these taxa. However, after analyzing the material directly from the cabinets, 26 specimens that had not yet been registered in the database were found in addition to the registered material. Thus, at the end of the search, it was verified that the collection currently has 976 specimens of the Amherstieae tribe.

Table 1. The total number of Amherstieae records per genera before and after the computerization process; and the number of Amherstieae specimens verified in the collection cabinets that had not yet been registered in the IAN database (Authors, 2021).

Genera found at IAN	Number of records before computerization	Number of specimens not yet registered	Number of records after computerization
***Amherstia* Wall.**	3	0	3
***Brownea* Jacq.**	23	0	23
***Crudia* Schreb.**	119	9	128
***Cynometra* L.**	105	0	105
***Dicymbe* Spruce ex Benth.**	13	0	13
***Elizabetha* R.H.Schomb. ex Benth.**	38	1	39
***Heterostemon* Desf.**	38	1	39
***Macrolobium* Schreb.**	586	14	600
***Paloue* Aubl.**	17	1	18
***Tamarindus* L.**	8	0	8
TOTAL	**950**	**26**	**976**

As shown in Table 1, among the 10 botanical genera observed, the most representative in the collection - before and after the study – were *Macrolobium*, *Crudia,* and *Cynometra*, which could be

due to the fact that among the observed genera, these three present the largest number of recognized species with 77, 37 and 113 species, respectively (Royal Botanic Gardens Kew 2022a, 2022b, 2022c). At the end of the survey, these three genera combined corresponded to over 85% of all IAN records of Amherstieae. The unregistered specimens located in the collection were of the genera *Macrolobium* (14), *Crudia* (09), *Elizabetha*, *Heterostemon,* and *Paloue* (01).

In total, the 976 observed samples of Amherstieae were identified in 119 distinct taxa and categories, including genus, species, subspecies, and variety names. It is noteworthy that 81 specimens had only the genus identified; the 895 other specimens had at least the species identified. The genera that had the most specimens with species identification were *Macrolobium* (52), *Cynometra* (18), *Elizabetha* (7), *Crudia* (2), *Dicymbe,* and *Tamarindus* (1).

Figure 3 indicated the richness of species or lower categories observed within each of the 10 genera. *Macrolobium* had the largest number of species, subspecies and varieties identified. It is noteworthy that *Amherstia* and *Tamarindus* had only one species each because they are monospecific genera.

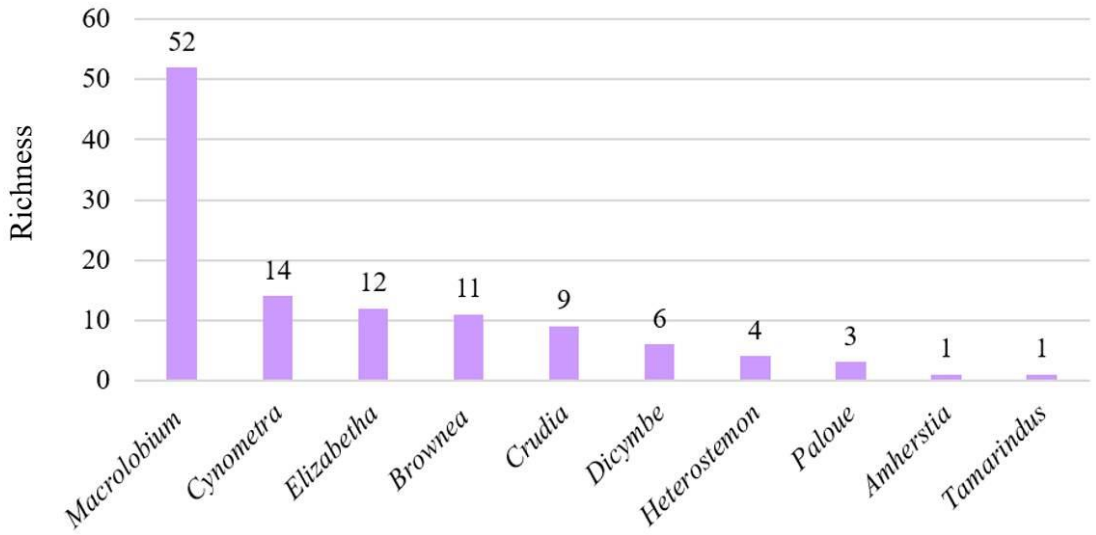

Figure 3. Richness of species or lower categories per genus of the Amherstieae tribe – IAN (Authors, 2021).

An analysis of the most abundant species or lower categories was also carried out within the three most representative genera of Amherstieae in the IAN Herbarium (*Macrolobium*, *Crudia,* and *Cynometra*) (Figure 4). It can be observed that the most abundant species of each genus were *Macrolobium acaciifolium* (Benth.) Benth. (85), *Crudia oblonga* Benth. (49) and *Cynometra bauhiniifolia* Benth. (26). It is noteworthy that *Macrolobium acaciifolium* was also the most abundant species among the IAN Herbarium Amhertieae collection, corresponding to 8.7% of the tribe's specimens.

Table 2 shows the major contributors to the IAN Herbarium Amherstieae collection. In total, it was possible to list 169 distinct collectors; However, it was decided to expose only those responsible for at least 10 collections, which totals 14 names. In addition, it is noteworthy that 18 specimens had no specified collector.

Regarding the IAN Herbarium collection, according to Martins-da-Silva *et al*. (2015, p. 2),

"several botanists such as Adolpho Ducke, George Black, Humberto Marino Koury, Normelia Vasconcelos, Paulo Cavalcante, Paul Ledoux, Ricardo Fróes, among others, have provided invaluable collaboration to this Herbarium".

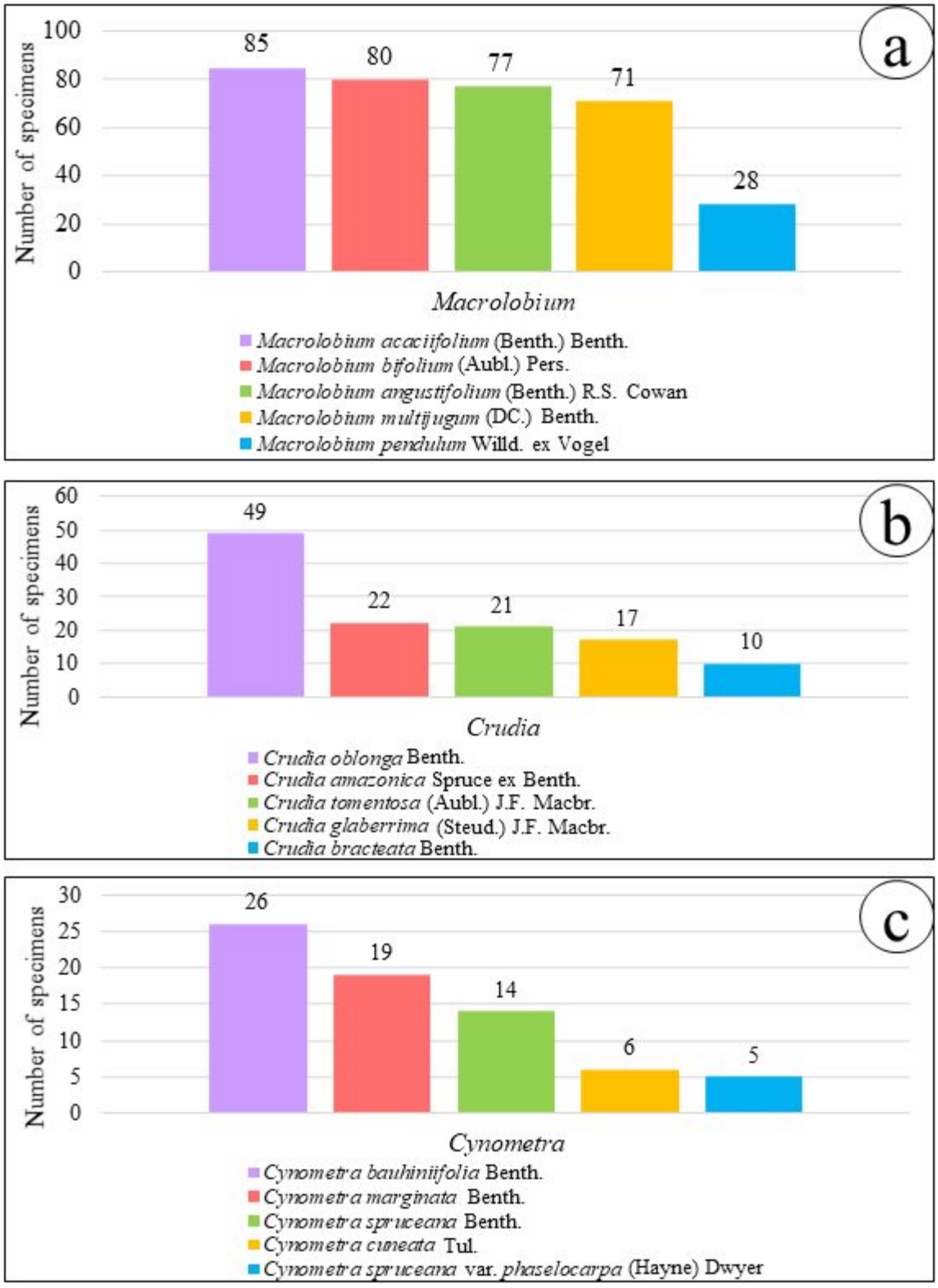

Figure 4. Number of specimens of the 5 most numerous species or lower categories of the most representative genera of Amherstieae at IAN: a. *Macrolobium*; b. *Crudia*; c. *Cynometra* (Authors 2021).

Table 2. Collectors who contributed the most to the Amherstieae tribe collection – IAN (Authors 2021).

Name of collector	Number of collections
Fróes, R.L.	147

Pires, J.M.	116
Oliveira, E.	60
Ducke, A.	50
Black, G.A.	34
Ribeiro, B.G.S.	33
Cordeiro, M.R.	28
Silva, N.T. da	36
Maguire, B.	16
Ferreira, A.M.	15
Archer, W.A.	15
Félix-da-Silva, M.M.	11
Schultes, R.E.	11
Ferreira, G.C.	10
Other collectors	376
No collector identified	18
TOTAL	**976**

This can be seen from the data shown in Table 2 since three of the five collectors with the largest contribution to the Amherstieae collection are cited by Martins-da-Silva *et al*. (2015) – Ducke A., Black G.A. and Fróes R.L. The samples for which these five collectors were responsible – Fróes R.L., Pires J.M., Oliveira E., Ducke A., and Black G.A. –, when combined, correspond to 41.7% of the tribe's specimens.

Figure 5 shows the names of the five collectors that most contributed to the collection of each of the three most representative genera of Amherstieae in the herbarium (*Macrolobium*, *Crudia,* and *Cynometra*).

It is observed that Fróes, R.L., and Pires, J.M. were the collectors that contributed the most to the collection of all three genera. Others cited by Martins-da-Silva *et al*. (2015) also feature in the graphics, such as Ducke, A. and Black, G.A.

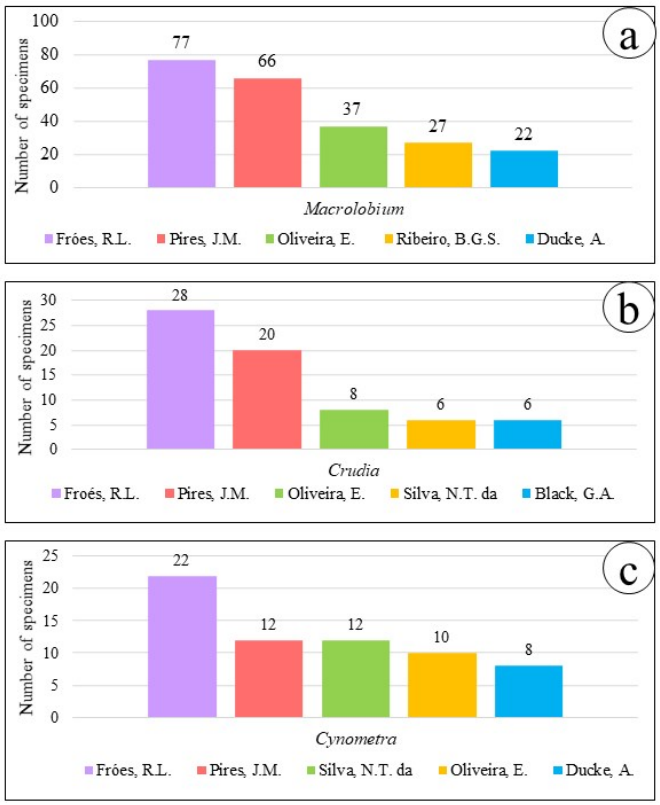

Figure 5. Collectors that contributed the most to Amherstieae's most numerous genera - IAN. a. *Macrolobium*; b. *Crudia*; c. *Cynometra* (Authors 2021).

It is noteworthy that among these three genera, *Macrolobium* was the one with the largest number of different collectors, totaling 131 collectors (77,5% of all collectors observed); next comes *Crudia*, with 44 collectors (26%); and *Cynometra*, with 34 (20,1%).

Regarding the dates of collection of the tribe's material, it was noticed that the decades with the most collections were from 1940 to 1970, with the 1940s being the period with the highest number of collections (Figure 6).

Figure 6 shows that the only periods that presented more than 100 collections were the 40's, 50's, 60's, and 70's. The samples of these four periods, when added together, correspond to 67.9% of the IAN Herbarium tribe's collection. In addition, it should be noted that 28 of the 976 exsiccates observed had no identification for the date of collection, which totaled only 2.9% of the collection.

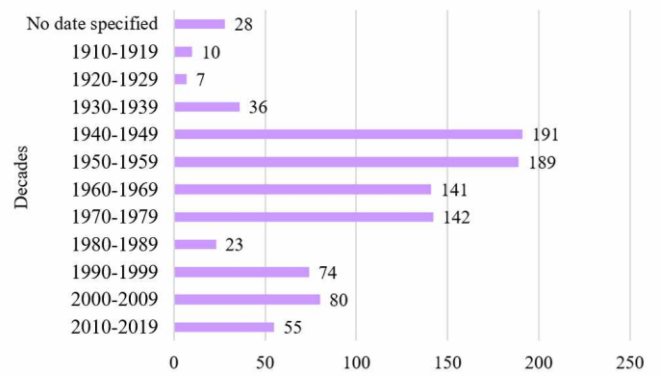

Figure 6. Number of specimens collected by decades of the Amherstieae tribe – IAN (Authors 2021).

Regarding the collection sites, it was observed that 885 samples (more than 90% of the total analyzed) were collected in Brazil. The others were collected in 8 different countries, as shown in figure 7 below. It is noteworthy, however, that 9 specimens had no identification of the country where the collection had been performed.

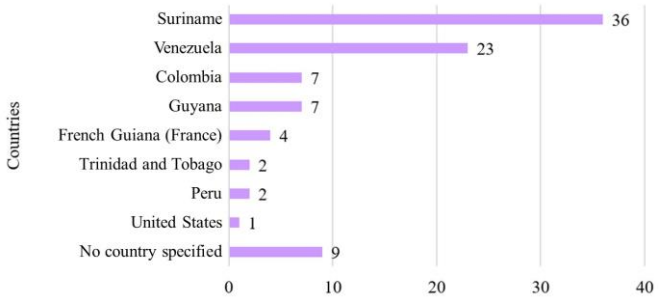

Figure 7. Number of specimens collected outside Brazil, by country, of the Amherstieae tribe – IAN (Authors, 2021).

Of the 885 samples collected in Brazil, 835 were collected in states belonging to the North Region of the country, corresponding to 94.3% of the material collected in Brazil and 85.5% of the IAN Amherstieae tribe collection. In addition, 438 originated in Pará, which corresponds to 49.5% of the material collected in the country and 44,9% of all collections. This is in accordance with Lewis et al. (2005), who mentions that the genera of the tribe tend to occur in evergreen humid tropical forests; the large number of collections originating from Brasil, the North Region, and Pará could be a consequence of the tribe being commonly found in these areas. The number of collections by State of Brazil is shown in Table 3.

Table 3. States of Brazil where there was collections of the Amherstieae tribe – IAN (Authors, 2021).

State of collection	Number of collections
Pará	438
Amazonas	271
Amapá	82
Roraima	21
Maranhão	17
Rondônia	17
Bahia	7
Acre	5
Mato Grosso	2
Goiás	2
Tocantins	1
São Paulo	1
No State specified	21
TOTAL	**885**

Among the 438 samples collected in the State of Pará, it was observed that 330 had data about the municipality of collection. 54 different municipalities of the state were mentioned, covering all 6 mesoregions of Pará. The municipalities with the largest number of collections - citing only those where more than 5 specimens were collected - are: Belém (84), Moju (83), Portel (15), Santarém (9), Almeirim (9), Santa Izabel do Pará (8) and Muaná (6). Belém and Moju present the largest number of collections because the IAN Herbarium and the Experimental Field of Embrapa Eastern Amazon are located in these municipalities, respectively. Figure 8 shows the 54 municipalities of Pará where material belonging to the Amherstieae tribe was collected.

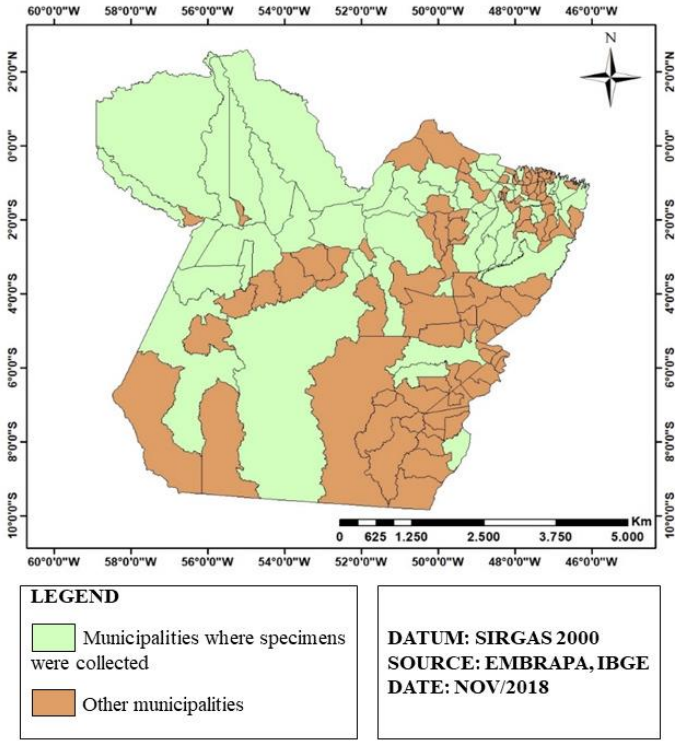

Figure 8. Municipalities of Pará where there was collections of the Amherstieae tribe – IAN (Authors 2021).

After separating the 330 collections with municipality identification by state mesoregions – as characterized by the Brazilian Institute of Geography and Statistics – IBGE (2022) –, a heterogeneous distribution of Amherstieae collections in the state was clearly noticed. More than 65% of these 330 collections were performed only in the Belém Metropolitan Region and the Northeast of Pará mesoregions, while less than 7% were performed in the Southeast of Pará and Southwest of Pará mesoregions combined (Figure 9).

The mesoregions with the most collections were the Northeast of Pará (119), followed by the Belém Metropolitan Region (96), Marajó (48), Lower Amazonas (44), Southeast of Pará (13), and Southwest of Pará (10).

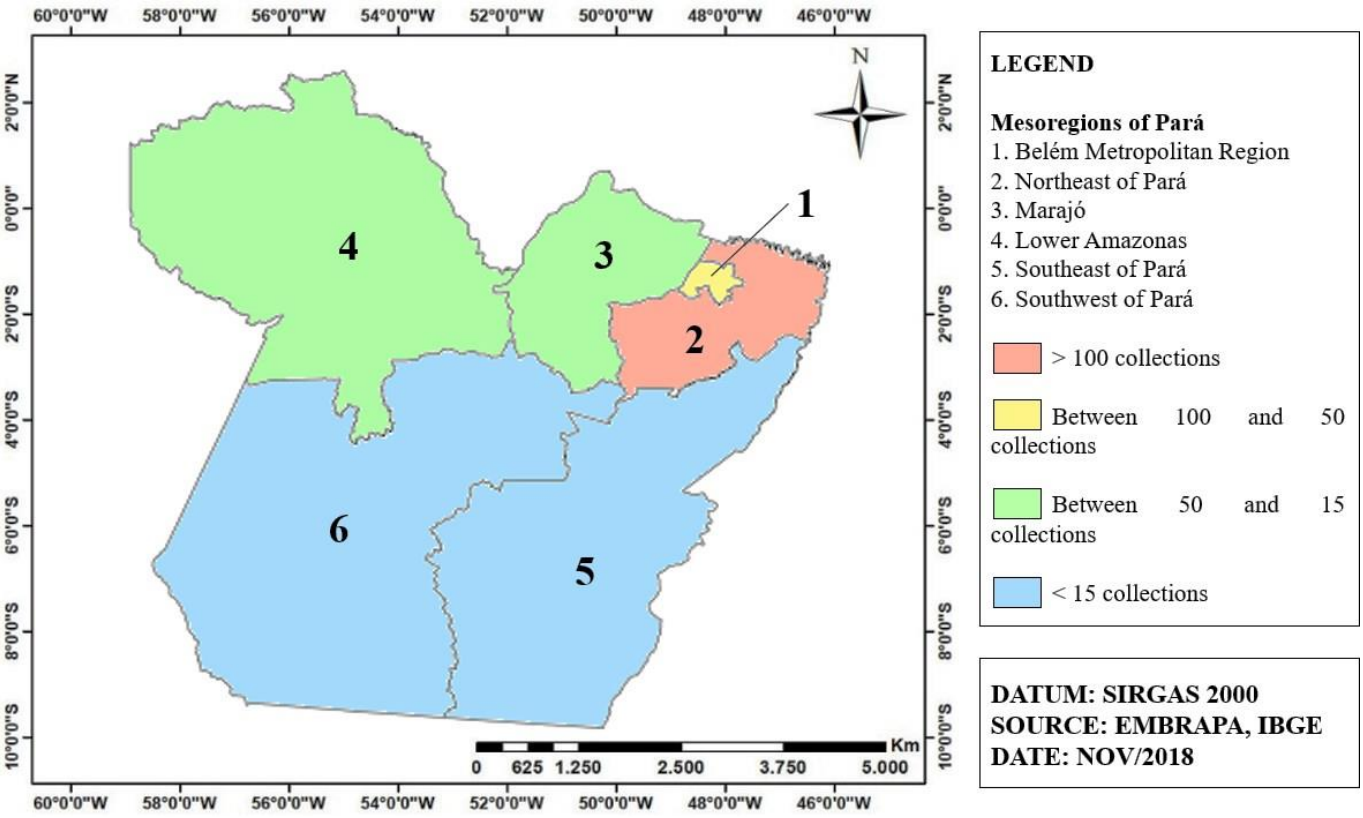

Figure 9. Number of collections of Amherstieae - IAN by mesoregions of the state of Pará (Authors 2021).

Figure 9 shows the heterogeneity of Amherstieae collections in the state. Mesoregions of large territorial extension, such as Southeast and Southwest of Pará, had less than 15 collections each. Therefore, it is suggested that more collections should be performed in these mesoregions, because

knowledge about the biodiversity in tropical regions, according to Senna *et al*. (2013), is essential to understand key processes and responses to forest degradation.

The geographic distribution of the genera of the Amherstieae tribe is extensive, reflecting the collection sites observed. *Macrolobium* is found from the Andes to the Eastern Amazon and the Brazilian coast, in Central America and Trinidad; *Brownea* has a center of diversity in northwestern South America; *Elizabetha*, *Heterostemon,* and *Paloue* are centered in the Guiana Shield region; and *Crudia* and *Cynometra* are pantropical genera present in Asia and the Pacific, Central and South America and the Caribbean, and Africa (Murphy *et al*. 2018, Royal Botanic Gardens Kew 2022b, 2022c).

Some of these species are also important ecological components in the rainforests of the humid tropics, such as those of the genera *Brownea* and *Macrolobium*; plants of this tribe also provide timber, e.g. *Macrolobium*, and are used as food, e.g. *Tamarindus*. In addition, several *Brownea* species are part of the South American cultural heritage, being used in rituals and considered sacred trees by certain indigenous tribes (Estrella *et al*. 2018).

The analysis of the data from the collectors with the largest contribution to the IAN Herbarium tribe collection corroborated the information provided by Martins-da-Silva *et al*. (2015), since numerous collections from Fróes, RL, Pires, JM, Ducke, A and Black, GA were observed.

As for the periods with the largest number of collections, the results were in agreement with Gomes and Martins-da-Silva (1997), who mentioned that between the 1940s and 1970s there was a great increase in material added to the Herbarium IAN collection. According to the authors, this was due to the emphasis given to botanical explorations between 1945 and 1960, as well as to the RADAM / BRAZIL project, carried out between 1961 and 1975. The importance of extensive Leguminosae collections in herbaria should also be stressed. Due to the great relevance of the family and its species, this group is often one of the most representative in the Brazilian botanical collections, and is one of the main families of herbarium collections such as MCMG in Minas Gerais; HTSA, in Pernambuco; HUTO, in Tocantins; and HAS, in Rio Grande do Sul (Kiill 2015, Santos *et al*. 2015, Senna *et al*. 2015, Veloso *et al*. 2017).

However, despite the relevance of the family - mainly in the Amazon - Souza *et al*. (2013) argue that unplanned socio-economic development in the region poses threats to local biodiversity, especially endemic species; therefore, precautions need to be taken to increase knowledge of these species before they become extinct.

Thus, since biological collections maintained by herbaria play a relevant role in meeting demands for information useful for environmental impact assessment, recovery of degraded areas, protection of threatened species, etc, disseminating this data to the public through the process of computerization has become essential (Mania & Assis 2008).

Since Amherstieae is a recently recircumscribed taxon, spreading information about specimens belonging to the tribe is of significant importance to research in this group. For this reason, in addition to the analysis of botanical data exposed in this study, the information inherent to the observed material was also made available online on the IAN Virtual Herbarium website.

These data, contained in the tags of the analyzed specimens, were entered into the herbarium database and imported to the website in question in November 2018 and were made available

for online access from January 2019. On the IAN Virtual Herbarium website, it is possible to obtain this information and also the images of each specimen, which helps in the identification of the botanical material of this tribe.

CONCLUSIONS

The analysis of the material of Amherstieae in the IAN Herbarium collection showed that there were representatives of 10 of the 50 genera of the tribe, corresponding to 976 specimens identified in 119 distinct taxa. 169 different collectors were responsible for these samples, which originated from 9 countries in total.

The country with the most collections of this tribe was Brazil (885 exsiccates). Among those originating in the state of Pará (438), it was possible to identify collections in 54 different municipalities. More than 65% of the state's Amherstieae collections belong to municipalities of the Metropolitan Region of Belém and Northeast of Pará, indicating a heterogeneous distribution of collections.

From the observation and analysis of this information, it is concluded that, since the Amhertieae tribe has been recently recircumscribed, it is of fundamental importance that the data related to it be disseminated and that more collections be made from the tribe, contributing to a greater supply of information regarding this taxon. This leads to an improvement in the curation of the collection, the conservation of the specimens, and the ease of access to this material.

With the gaps highlighted regarding the specimens' current state, it was found that the collection needs to be revisited so we can achieve the minimum data quality and technical reserve, mainly regarding old collections, which have gone through different techniques and protocols.

For this reason, its botanical data and images have been included in the IAN Virtual Herbarium, which can be consulted from anywhere in the world, thus aiding future research on this tribe.

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