



## FABACEAE LIND. OF THE ENVIRONMENTAL PROTECTION AREA OF THE MIDDLE BURITI, CAXIAS, MARANHÃO, BRAZIL

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### ABSTRACT

The research had the objective of identify the species of Leguminosae In the Buriti do Meio Environmental Protection Area, in the city of Caxias / Maranhao, Brazil, to describe the patterns of family diversity in relation to the subfamily, genus and species, as well as to determine the pattern of taxa distribution in the studied area. 26 genera were inventoried, distributed in 30 species. Faboideae presented the largest number of species, followed by Caesalpinoideae and Mimosoideae. The species showed habit of tree growth, followed by herb, shrub and sub - bush. It is hoped that the research has contributed to the conservation of the species and future studies of the taxa of this botanical family, which has importance as fodder, food, ornamental, medicinal, among others.

**KEYWORDS:** Conservation Unit, species diversity, Brazilian Cerrado.

### FABACEAE LIND. DA ÁREA DE PROTEÇÃO AMBIENTAL DO BURITI DO MEIO, CAXIAS/MARANHÃO

### RESUMO

A pesquisa teve o objetivo de conhecer as espécies de Leguminosae ocorrentes na Área de Proteção Ambiental do Buriti do Meio, no município de Caxias/MA, descrever os padrões de diversidade da família em relação a subfamília, gênero e espécie, além de determinar o padrão de distribuição dos taxa na área estudada. Foram inventariados 26 gêneros, distribuídos em 30 espécies. Faboideae apresentou o maior número de espécies, seguida por Caesalpinoideae e Mimosoideae. As espécies apresentaram hábito de crescimento de árvore, seguido por erva, arbusto e subarbusto. Espera-se que a pesquisa tenha contribuído para a conservação das espécies e futuros estudos dos taxa desta família botânica, que tem importância como forrageira, alimentícia, ornamental, medicinal, dentre outras.

**PALAVRAS-CHAVE:** Unidade de Conservação, Diversidade de espécie, Cerrado brasileiro.

## INTRODUCTION

Fabaceae Lindl. or Leguminosae Adans according to LIMA (2000) is the most representative family in Brazil, due to the fact that it is found in all Brazilian phytogeographic domains. This family has a cosmopolitan distribution and can be found in many different habitats. Fabaceae is the third largest family of Angiosperms and comprises three subfamilies (Caesalpinoideae, Mimosoideae and Papilionoideae), 36 tribes, approximately 727 genera and 19,325 species (LEWIS et al., 2005; GAMA et al., 2013). According to BARROSO et al., (1991) in Brazil there are about 2,100 native species distributed in 188 genera. Among the species stand out food plants such as: beans, peanuts, soy, Ingá, peas; medicinal, ornamental, forage and suppliers of noble woods.

As for their sub-families, each has characteristics that differ them. The subfamily Caesalpinoideae has approximately 154 genera and 2,800 species, occurring in tropical and subtropical regions, mainly in South America, tropical Africa and Southeast Asia, and is poorly represented in North America and other temperate regions. In Brazil, approximately 178 genera and approximately 1,550 species were cataloged (BARROSO et al., 1984).

The Mimosoideae subfamily has 82 genera (LEWIS et al., 2005) distributed in the tropical, subtropical and temperate regions of the world, including approximately 3,200 species. For ELIAS (1981), large Mimosoideae diversity centers are referred to Tropical America (most species occur in Central and South America), Africa and Asia - Australia. Genres like *Parkia* R.Br., *Pentaclethra* Benth., *Albizia* Durazz. and *Calliandra* Benth., Are native not only to Central and South America but also to the tropical region of Africa, which may indicate a past union between these two continents. Most of the members of this subfamily are common in tropical lowland forests, especially in rivers and lakes, and are also adapted to savannas and desert regions in tropical America and Africa, being absent at high altitudes (ELIAS 1981, SIMON et al. 2011).

Papilionoideae is represented by 28 tribes, 500 genera and 13,800 species (LEWIS et al., 2005). In this subfamily, genera of herbaceous plants are common in temperate regions, while in tropical regions, there are more woody species. It presents a very wide distribution, in the tropical, subtropical zones, extending to the temperate regions, but its greater diversity is in the American and African tropics. It is constituted by representatives of different types of habits, including herbs, lianas and trees (BARROSO et al., 1991).

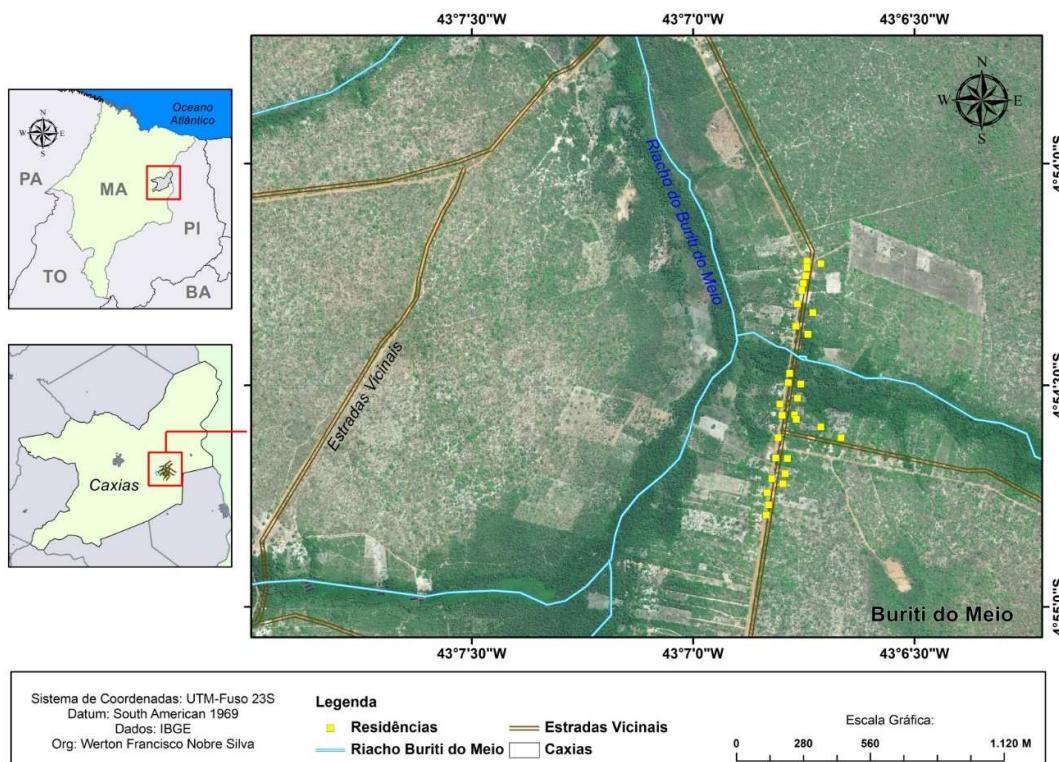
Fabaceae is recognized because of its ecological and economic potential. Among the economical utilities, it is possible to highlight the use in human food, such as forage, ornamental and green fertilization (MIOTTO et al., 2008). In addition, various species of legumes established associations with bacteria of *Rhizobium* *Bradyrhizobium* and genres, promoting nitrogen fixation and soil fertility (JUDD et al., 2009; MIOTTO, 2011).

The objective of this work was to carry out an inventory of the Fabaceae species occurring in the Environmental Protection Area of Buriti do Meio, and to describe the diversity patterns of the family in relation to the subfamily, genus and species. To Study the area and the environments of occurrence of the species and the types of habits that they present.

## MATERIAL AND METHODS

### STUDY AREA

The Buriti do Meio Environmental Protection Area, created by Law No. 1,540 / 2004 dated March 25, 2004, is located in the Buriti do Meio and Santa Rosa Settlement Project, in the 2nd District of Caxias, with an area of 58,347, 30 ha. Distant about 35 km from the seat of the city (Figure 1). The vegetation of the study area consists of different physiognomies of natural and anthropic cerrado, with sandy, acidic, nutrient-poor and fragile soils (CAXIAS, 2004).



**FIGURE. 1** Map highlighting the physical area of the APA Buriti do Meio. **SOURCE:** IBGE, (2006); Datum: D. South American. 1969; Adapted: SILVA, (2014).

### COLLECTION METHODOLOGY

Monthly excursions were carried out at the Buriti do Meio APA from January to May 2015 and September 2015 to January 2016, the collection method used was the Random Walk, to explore the largest possible number of microenvironments within the Study, aiming at the collection and registration of specimens. The specimens were collected from four to five duplicates with the presence of flowers and / or fruits, making notes with information of the environment in which they were found, as well as the habit of plants.

### LABORATORY WORK

Soon after the field collection, the specimens were taken to the Laboratory of Plant Biology/LABIVE to be pressed and thus initiate the herborization process, where the specimens were arranged in sheets of newspapers with alternating paperboard, pressed and exposed to temperature Environment for drying the material. After the drying process, exsiccate assemblies were made. The material

identifications were made through the comparison of morphological and reproductive structures, with the specimens stored in Herbarium Prof. Aluizio Bittencourt/HABIT, analyzed specimens by specimens, was also used researches in monographs, articles, virtual herbaria, taxonomic keys and were confirmed with the aid of a specialist in the group. Consultation of the List of Flora of Brazil 2020 was carried out, in order to obtain the phytogeographic domains and geographic distribution in which the species meet.

## RESULTS AND DISCUSSION

Twenty-six genera, distributed in 30 species (Table 1), were inventoried to the Buriti do Meio APA, demonstrating the representativeness of the Fabaceae family in the area. All the subfamilies belonging to the Fabaceae were sampled, considering a quite different sampling contingent. The family has a wide distribution around the globe, as it is present both in tropical forests and deserts, plains and alpine regions, being represented in several environments (DOYLE & LUCKOW, 2003).

**TABLE 1.** Representation of genera and species, environments found and the habit of plant growth.

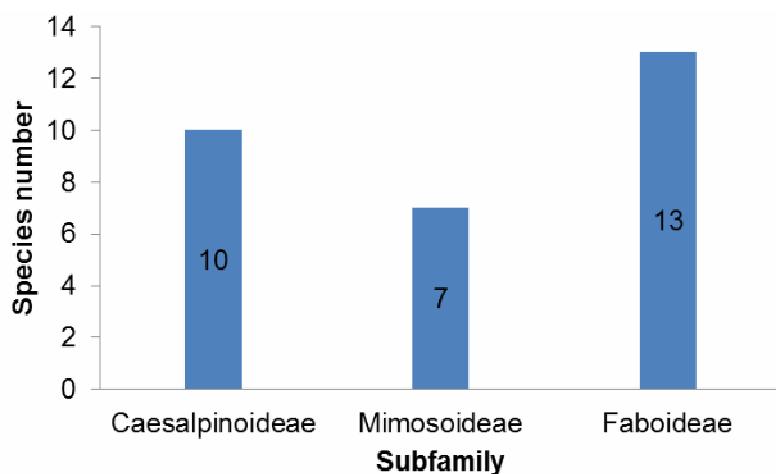
Species	Env.	Habit	Geo. Dom.	Geo. Dis.
<i>Aeschynomene histrix</i> Poir.	RM	Herb	AM / CA / MA / PN	AC, AM, AP, PA, RR, TO AL, BA, CE, MA, PB, PE, PI, SE, MG, SP, DF, GO, MS, MT, PR
<i>Aeschynomene paniculata</i> Willd. ex Vogel.	TIV	Herb	AM / CA / CE / MAPN	AC, AM, AP, PA, RO, RR, TO, BA, CE, MA, PI, SE DF, GO, MS, MT, MG, RJ, SP, PR
<i>Andira humilis</i> Mart. ex Benth.	TIV	Sub-bush	AM / CA / CE	PA, RO, BA, MA, PE, RN DF, MS, MT, MG, SP, PR
<i>Bauhinia dubia</i> G.Don	TIV	Herb	AM / CE	AM, PA, TO, CE, MA, PI
<i>Centrosema venosum</i> Mart. ex Benth.	RM	Herb	AM / CA / CE	AM, AP, PA, RR, TO, BA, CE, MA, PI, DF, GO, MS, MT, MG, RJ, SP
<i>Copaifera langsdorffii</i> Desf.	TIV	Tree	AM / CA / CE / MA	AC, AM, RO, TO, DF, GO, MS, MT, BA, CE, MA, PB, PE, PI, RN, ES, MG, RJ, SP, PR, RS
<i>Chamaecrista calycioides</i> (DC. ex Collad.) Greene	RM	Bush	AM / CA / CE / MA	AM, PA, RO, AL, BA, CE, MA, PB, PE, PI, RN, SE, GO, MS, MT, ES, MG, RJ, SP
<i>Crotalaria retusa</i> L.	NC	Sub-bush	AM / CA / CE / MA / PN	PA, BA, MA, PI, MG, RJ, SP, PR, RS, SC,

<i>Delonix regia</i> (Bojer ex Hook.) Raf.	RM	Tree	EC	AC, AM, AP, PA, RO, RR, TO, BA, CE, MA, PB, PE, PI, RN, SE, DF, GO, MS, MT, ES, MG, RS, SC
<i>Desmodium barbatum</i> (L.) Benth.	RM	Herb	AM / CA / CE / MA / PM / PN	AC, AM, AP, PA, RO, RR, TO, BA, CE, MA, PB, PE, PI, RN, SE, DF, GO, MS, MT, ES, MG, RS, SC,
<i>Dioclea bicolor</i> Benth.	NC	Bush	AM / CA / CE	AC, AM, PA, CE, MA, GO, MT
<i>Dimorphandra gardneriana</i> Tul	TIV	Tree	CA / CE	PA, TO, BA, CE, MA, PE, PI, GO, MT, MG
<i>Galactia jussiaeana</i> Kunth	RM	Herb	AM / CA / CE	AM, AP, PA, RO, RR, BA, MA, PI, GO
<i>Hymenaea stigonocarpa</i> Mart. ex Hayne	RM	Tree	AM / CA / CE / PN	PA, TO, BA, CE, MA, PE, PI, DF, GO, MS, MT, MG, SP
<i>Libidibia ferrea</i> (Mart. ex Tul.) L.P.Queiroz	RM	Tree	CA / CE / AMT	AL, BA, CE, MA, PB, PE, PI, RN, SE, ES, MG, RJ
<i>Macroptilium gracile</i> (Poepp. ex Benth.) Urb.	RM	Sub-bush	AM / CA / CE / AMT	AM, AP, PA, RR, BA, CE, MA, PB, PE, PI, GO, MS, MT, MG, RJ, SP
<i>Macroptilium lathyroides</i> (L.) Urb.	RM	Sub-bush	AM / CE / AMT / PN	AM, PA, RR, AL, BA, CE, MA, PB, PE, PI, DF, GO, MS, MT, ES, MG, RJ, SP, PR
<i>Mimosa caesalpiniifolia</i> Benth.	TIV	Tree	AM / CA / CE / AMT	AM, PA, RO, AL, BA, CE, PB, PE, PI, RN, DF, GO, MS, ES, MG, RJ, SP, PR, SC, SE
<i>Mimosa pudica</i> L.	NC	Bush	AM / CA / CE / AMT	AM, PA, RO, RO, BA, PE, DF, MS, MT, ES, MG, RJ, SP, PR, RS, SC
<i>Mimosa xanthocentra</i> Mart.	TIV	Bush	AM / CE / AMT	PA, RO, TO, BA, CE, MA, PI, DF, GO, MT, MS, MG,
<i>Parkia platycephala</i> Benth.	TIV	Tree	AM / CA / CE	PA, TO, BA, CE, MA, PB, PE, PI, RN, DF, GO, MT
<i>Periandra coccinea</i> (Schrad.) Benth.	TIV	Herb	AM / CA / CE / AMT	PA, RR, TO, AL, BA, CE, MA, PB, PI, RN, DF, GO, MT, MS, MG, SP
<i>Plathymenia reticulata</i> Benth.	TIV	Tree	AM / CA / CE / AMT	PA, BA, CE, MA, PI, DF, GO, MS, MT, ES, MG, RJ, SP, PR

<i>Pterodon emarginatus</i> Vogel	TIV	Tree	AM / CA / CE / PN	RO, TO, BA, CE, MA, PI, DF, GO, MS, MT, MG, SP
<i>Senegalia polyphylla</i> (DC.) Britton & Rose	RM	Bush	AM / CA / CE / AMT / PN	AM, PA, AL, BA, CE, MA, PB, PI, SE, DF, GO, MS, MT, ES, MG, RJ, SP, PR
<i>Senna reticulata</i> (Willd.) H.S.Irwin & Barneby	NC	Bush	AM / CA / CE	AC, AM, AP, PA, RO, BA, CE, MA, PE, PI, GO, MT, MG, MG, SP
<i>Stryphnodendron coriaceum</i> Benth.	TIV	Tree	CA / CE	TO, BA, CE, MA, PI, GO, MG
<i>Stylosanthes viscosa</i> (L.) Sw.	RM	Herb	AM / CA / CE / AMT	AM, AP, PA, RO, RR, AL, CE, MA, PB, PE, PI, RN, SE, DF, GO, MS, MT, ES, MG, RJ, SP, PR, RS, SC
<i>Tachigali vulgaris</i> L.G.Silva & H.C.Lima	TIV	Tree	AM / CA / CE	AM, PA, TO, BA, CE, MA, PI, DF, GO, MS, MT, MG, SP
<i>Tamarindus indica</i> L.	RM	Tree	AM / CA / CE / AMT	AC, AM, AP, PA, RO, RR, TO, BA, CE, MA, PB, PE, PI, RN, SE, DF, GO, MS, MT, ES, MG, RS, SC

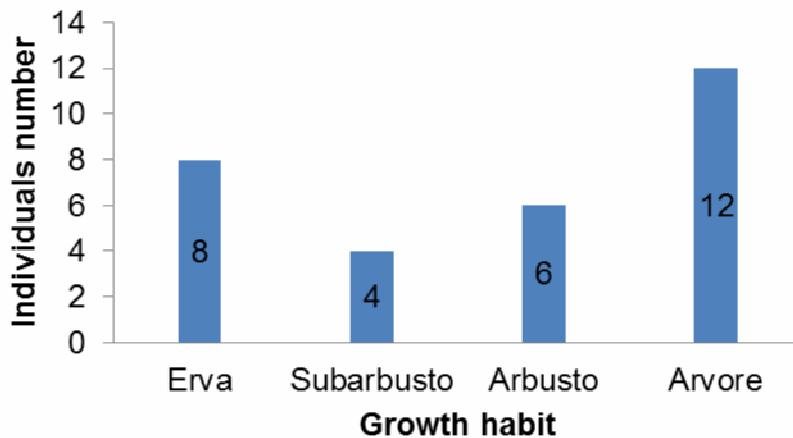
Legend: **Env.** - Environment; **Geo. Dom.** - Geographical Domain; **Geo. Dis.** - Geographic distribution; **RM**- Road Margin; **HIV** – Trail inside the vegetation; **NC** - Next to the creek. **CA** -Caatinga; **CE** -Cerrado; **AM** -Amazonia; **AMT**-Atlantic -Mata; **PM** -Pampa; **PN** - Pantanal.

For the subfamilies sampled, Faboideae presented the largest number of species (13spp), followed by Caesalpinoideae (10spp) and Mimosoideae (7spp), as shown in Figure 2. Faboideae is the largest subfamily of Fabaceae, features fairly wide distribution which confirms their representativeness in the tropical, subtropical areas, extending to temperate regions, but their greatest diversity is found in the tropics and African American (SILVA & TOZZI, 2012; SINISCALCHI, 2012).



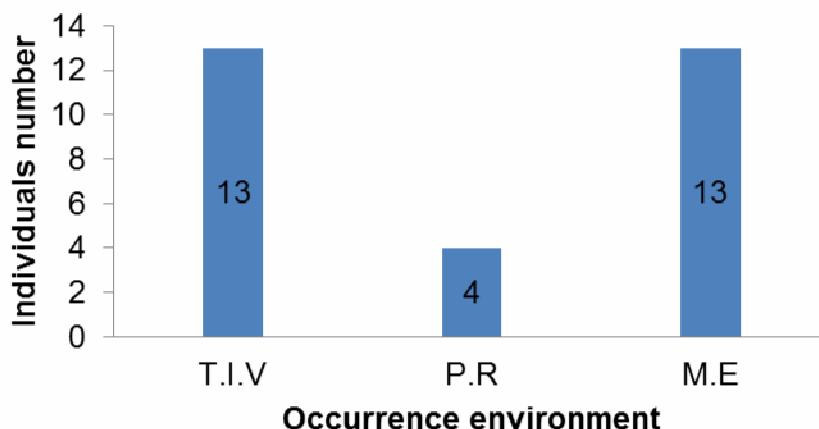
**FIGURE 2:** Graphical representation of the distribution of how many subfamilies to sampled specimens.

The most prevalent growth habit was tree (12 sp), followed by grass (8 sp), shrub (6 sp) and sub-shrub (4 sp), according to figure 3. The family presents a variety of habit of Growth, but the study of the spatial distribution of trees has great interest for forest management, since it is related to the individuals growth, the diameter distribution, the density of trees and, consequently, the volumetric production (SILVA et al. 2004).



**FIGURE 3.** Graphical representation of the distribution of growth habit as the collected individuals.

Regarding the occurrence environment, most species of the Fabaceae family were found in trails inside the vegetation and along the roadside, both of which totaled 13 occurrences each, the minority of the species sampled were located near creek (Figure 4). In the cerrado the family presents itself in a great variety of environments. The cerrado *sensu lato* can now therefore be considered a tropical environment that hold high share of knowledge about its vegetation and calls attention to possible processes responsible for ecological standards identified to date, serving as a habitat for a great diversity for the family Fabaceae (NETTESHEIM et al., 2010).



**FIGURE 4.** Representation of the distribution of species raised about environment of occurrences collected.

For the State of Maranhao, there are few works for the Fabaceae family, where only the works of RODRIGUES et al., (2008) on Leguminosae (Juss.) From a cerrado fragment in Caxias, Maranhao, Brazil, and recently a list Floristry from CONCEIÇÃO et al., (2012) and a taxonomic survey of SILVA (2016) for the Inhamum APA. Thus the present study becomes revealing because it is a pioneer in the area of study.

### CONCLUSION

The Environmental Protection Area of Buriti do Meio presented a considerable diversity for the Fabaceae family, with 30 species, distributed in 26 genera, with the occurrence of three subfamilies: Faboideae, Mimosoideae and Caesalpinoideae, with Faboideae presenting 13 species.

The occurrence of the species is related to the phytogeographic domain of the Cerrado, with predominant tree growing habit. It is hoped that the research has contributed to the conservation of the species and future studies of the taxa of this botanical family, which has importance as fodder, food, ornamental, medicinal and others.

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