THE PIRASSUNUNGA AIR FORCE FARM AS A POTENTIAL AREA OF BIODIVERSITY CONSERVATION IN THE MOGI GUAÇU RIVER BASIN, SP

A FAZENDA DA AERONÁUTICA DE PIRASSUNUNGA COMO POTENCIAL ÁREA DE CONSERVAÇÃO DA BIODIVERSIDADE NA BACIA HIDROGRÁFICA DO RIO MOGI GUAÇU, SP

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ABSTRACT

The Semideciduous Seasonal Forest is a phytophysiognomy of Atlantic Forest domain, highly fragmented and threatened by agricultural expansion inland of São Paulo State. The Pirassununga Air Force Farm (FAYS) presents a set of fragments Semideciduous Seasonal Forest and Cerrado (brazilian savanna) in addition to Riparian Vegetation fragments totalizing about 1500 hectares, indispensable to São Paulo State biodiversity conservation. Through random walks by the transition of Mogi Guaçu River's Riparian Vegetation and Semideciduous Seasonal Forest main track, it was possible to recognize 16 tree species of differents threat levels, some of these also considered target to São Paulo State biodiversity conservation. The current study searched to contrast FAYS´s Seasonal Semideciduous Forest phytophysiognomy aspects that allow to use it like strategic point of conservation of regional biodiversity, in association with Conservation Units nearby, by future ecological corridors.

Keywords: Conservation. Ecological Corridors. Riparian Vegetation. Semideciduous Seasonal Forest.

RESUMO

A Floresta Estacional Semidecidual é uma fitofisionomia do domínio Mata Atlântica, altamente fragmentada e ameaçada pela expansão agrícola no interior do Estado de São Paulo. A Fazenda da Aeronáutica de Pirassununga (FAYS) apresenta um conjunto de fragmentos de Floresta Estacional Semidecidual e Cerrado, além da Vegetação Ripária somando cerca de 1500 hectares, fundamentais para a conservação da biodiversidade no Estado de São Paulo. Por meio de caminhadas aleatórias pela trilha principal do fragmento de transição da Vegetação Ripária do Rio Mogi Guaçu e Floresta Estacional Semidecidual foi possível reconhecer 16 espécies arbóreas de diferentes níveis de ameaça, algumas destas também consideradas alvo para a conservação da biodiversidade no Estado de São Paulo. No presente estudo buscou-se destacar aspectos da fitofisionomia de Floresta Estacional Semidecidual da FAYS que permitam utilizá-la como ponto estratégico de conservação da biodiversidade da região, em associação com Unidades de Conservação próximas, através de futuros corredores ecológicos.

Palavras-chaves: Conservação. Corredores Ecológicos. Vegetação Ripária. Floresta Estacional Semidecidual.

The remaining vegetation in the São Paulo State is highly fragmented and about 80% of the fragments have less than 20 hectares (KRONKA et al., 2005; NALON; MATTOS; FRANCO, 2008). Of the 85,290 plant existing fragment in the São Paulo State, only 539 (0.5%) have an area of 500 hectares or more (NALON; MATTOS; FRANCO, 2008). The Semideciduous Seasonal Forest (Atlantic Forest domain) and the Cerrado (brazilian savanna) were the most devastated, both now exhibiting less than 10% of previously existent cover, besides being poorly represented in Conservation Units (DURIGAN et al., 2008). These remnants have their function of biodiversity

conservation compromised due to fragmentation, urbanization and agricultural pressure (KRONKA et al., 2005; RODRIGUES; BONONI, 2008). Among the main actions proposed for the biodiversity conservation in the São Paulo State, are the creation of ecological corridors and the collection of biological data (METZGER et al., 2008).

The São Paulo State is divided in 22 Units of Water Resources Management of Hydrographic Basins (KRONKA et al., 2005). Among them contrast the Mogi Guaçu Basin Unit, where there are only 16 Conservation Units and other areas specially protected, of which two units are Environmental Protection Areas and only four Conservation Units with an area equal or greater than 1,500 hectares (XAVIER; BOLZANI; JORDÃO, 2008). There are nine Conservation Units managed by the (Instituto Florestal), four of them with more than 4,500 hectares, located in the municipalities of Mogi Guaçu (Estação Experimental de Mogi-Guaçu, Reserva Biológica de Mogi-Guaçu and Estação Ecológica de Mogi-Guaçu), Luís Antônio (Estação Experimental de Luis Antônio and Estação Ecológica do Jataí) and Santa Rita do Passa Quatro (Estação Experimental de Santa Rita do Passa Quatro and Parque Estadual de Vassununga) (KRONKA et al., 2005). All these Conservation Units are relatively near to the Pirassununga Air Force Farm (FAYS), which in turn can be connected to one or more of these Conservation Units though of ecological corridors.

In the São Paulo State, there are still many vegetation fragments that are not yet under the protection of Conservation Units (METZGER et al., 2008; XAVIER; BOLZANI; JORDÃO, 2008). Conservation Units are areas of special relevance to environmental conservation, playing a highly significant role in maintaining biodiversity (XAVIER; BOLZANI; JORDÃO, 2008), but there are other possibilities. In a study carried out in the region of BR163 in the state of Pará, 39.1% of the studied area consists of protected areas, of which 12.8% are Conservation Units, 19.6% are indigenous territories and 6, 7% are military areas belonging to the Ministry of Aeronautics; thus, about half of all this protected area does not constitute Conservation Units (FURTADO; MONTEIRO, 2006). There are possibilities of connecting some Conservation Units and other forest

fragments, incorporating new frontiers, with the insertion of significant holding areas with high potential for conservation (XAVIER; BOLZANI; JORDÃO, 2008).

The FAYS has a total area of 6,502 hectares, with approximately 3,500 hectares occupied by agricultural activities, such as cultivation and processing of sugarcane, corn, soybeans, rice, beans, coffee and animal farming. It is important for the biodiversity conservation, because presents about 1,500 hectares that comprise Semideciduous Seasonal Forest fragmented areas associated to the Mogi Guaçu River Riparian Vegetation and Cerrado (brazilian savanna) formations (ZANDONADI et al., 2015). Riparian Vegetation acts on water quality, prevention of erosion and silting of the river bank, regulation of nutrients and sediment inputs and the incidence of solar radiation, contributing to the thermal stabilization of water (CARDOSO-LEITE et al., 2004).

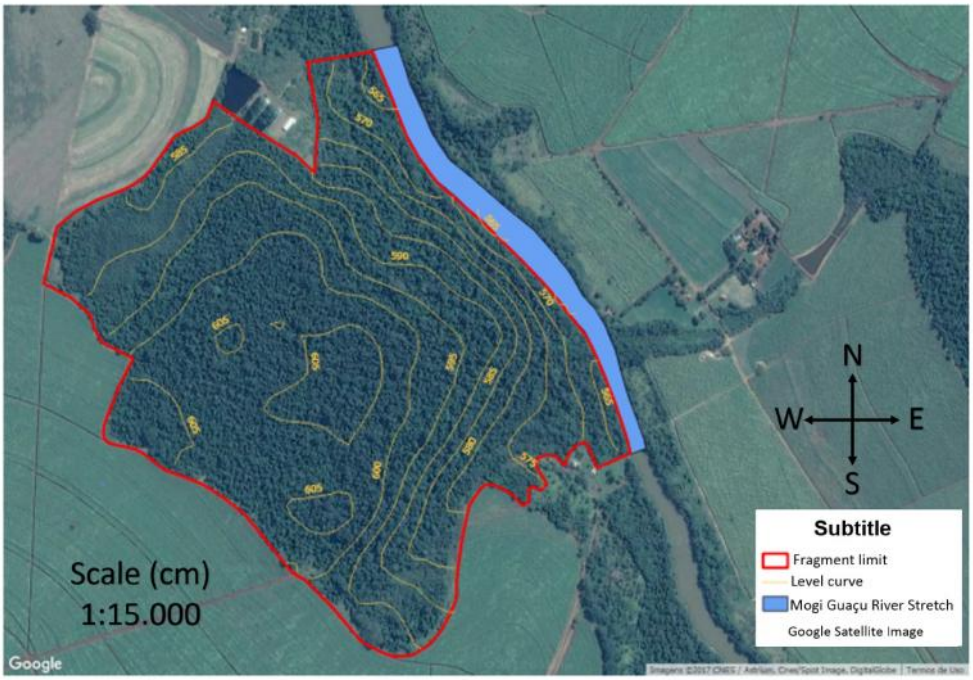
Although not constituting a Conservation Unit, the FAYS is an area containing large and well protected forest fragments. Thus, based on the tree species present in the transition area between Riparian Vegetation and Semideciduous Seasonal Forest, the aim of this study was recognize the importance of forest fragments of FAYS for future connection with others protected areas by ecological corridors, contributing to the conservation of biodiversity in the Mogi Guaçu River Basin.

During the year 2016 were performed random walks by the transition of Mogi Guaçu River's Riparian Vegetation and Semideciduous Seasonal Forest main track. It was collected vouchers of tree species in vegetative or reproductive stage, the latter deposited in the Herbarium of (Universidade Federal de São Carlos), *campus* Araras.

The transition area of Semideciduous Seasonal Forest and Riparian Vegetation in FAYS occurs at a lower altitude portion and the better preserved areas of Semideciduous Seasonal Forest are in higher altitude areas (Figure 1).

Figure 1. Map of the main continuous Semideciduous Seasonal Forest fragment to the Riparian Vegetation of the Mogi Guaçu River. The area delimited in red corresponds to the border of the fragment; the area

marked in blue corresponds to the section of the Mogi Guaçu River, from which the Riparian Vegetation is continuous to the Semideciduous Seasonal Forest; the yellow lines correspond to the area level curves. Scale: 1:15.000 centimeters (Image from Google).



It is possible to estimate the FAYS potential in the conservation of local biodiversity when comparing the preliminary studies made in its fragments with the few studies already conducted in other regions of the Mogi Guaçu River Basin. The Table 1 presents a preliminary list of some tree species recognized for FAYS, as well as their degree of threat. These species were recognized through periodic visits to the transition area between the Riparian Vegetation and the Semideciduous Seasonal Forest, which extend for about four kilometers on the banks of the Mogi Guaçu River. Of the 16 species reported here, eight are not reported for fragments of the Semideciduous Seasonal Forest in the Municipality of Socorro (SARTORI et al., 2015) and 13 are not cited for the Jataí Ecological Station in the Municipality of Luiz Antônio (TOPPA; PIRES; DURIGAN, 2004), constituting important biological records for the region. Both studies were conducted in areas of Semideciduous Seasonal Forest belonging to municipalities belonging to the Mogi Guaçu River Basin, as well as to FAYS.

Table 1. Recognized tree species for the transition area of the Mogi Guaçu River and the Semideciduous Seasonal Forest at the Pirassununga Air Forces Farm (FAYS) and respective degree of threat, according to CNCFLORA (FLORA DO BRASIL 2020 em construção, 2017). The occurrence of these species is compared to the studies conducted in the municipalities of Luiz Antônio (MLA) (TOPPA; PIRES; DURIGAN, 2004) and Socorro (MS) (SARTORI et al., 2015), also belonging to the region of the Mogi Guaçu River Basin. Species marked with * are considered target species for the biodiversity conservation in the São Paulo State (DURIGAN et al., 2008).

Family/Species	**MLA**	**MS**	**Degree of threat**
Anacardiaceae			
Astronium gravolens Jacq.			Least Concern
Apocynaceae			
Aspidosperma cylindrocarpon Müll.Arg.			Least Concern
Aspidosperma polyneuron Müll.Arg.	X		Near Threatened
Arecaceae			
Euterpe edulis Mart.*	X		Vulnerable
Euphorbiaceae			
Pachystroma longifolium (Nees) I.M.Johnst.	X		Not Evaluated
Fabaceae			
Centrolobium tomentosum Guillem. ex Benth.		X	Least Concern
Enterolobium contortisiliquum (Vell.) Morong		X	Not Evaluated
Holocalyx balansae Micheli			Not Evaluated
Hymenaea stigonocarpa Mart. Ex. Hayne			Not Evaluated
Myroxylon peruiferum L.*			Least Concern
Lecythidaceae			
Cariniana estrellensis (Raddi) Kuntze	X		Not Evaluated

Cariniana legalis (Mart.) Kuntze*	X		Endangered
Malvaceae			
Pseudobombax grandiflorum (Cav.) A.Robyns	X	X	Least Concern
Meliaceae			
Cedrela fissilis Vell.*	X		Vulnerable
Phytolaccaceae			
Gallesia integrifolia (Spreng.) Harms			Not Evaluated
Rutaceae			
Balfourodendron riedelianum (Engl.) Engl.*	X		Near Threatened

Of the 16 tree species mentioned here, two are considered vulnerable, *Euterpe edulis* Mart. and *C. fissilis*, while *C. legalis* is considered endangered (FLORA DO BRASIL 2020 em construção, 2017). The species considered endangered for the State of São Paulo are *E. edulis*, *H. stigonocarpa* and *A. polyneuron*. (MAMEDE et al., 2007). There are six species not evaluated for the degree of threat (FLORA DO BRASIL 2020 em construção, 2017), which does not mean that they are effectively protected. Likewise, species of the least concern group may enter into a greater degree of threat because of vegetation fragmentation. *A. polyneuron, B. riedelianum, C. fissilis, E. edulis* and *M. peruiferum* are considered target species for biodiversity conservation because they are threatened with extinction or have a low occurrence in the State of São Paulo (DURIGAN et al., 2008).

This is the first study about tree species in FAYS, but some other studies already conducted in its fragments also reinforce the potentiality for the conservation of local biodiversity. About 19 species of Malpighiaceae were recognized for FAYS (BUTOLO et al., 2015), representing 15% of the total species cited for the State of São Paulo (FLORA DO BRASIL 2020 em construção, 2017). In another preliminary study, 10 species of Orchidaceae were recognized in FAYS, in areas of

Riparian Vegetation of the Mogi Guaçu River, four terrestrial and six epiphytes (ZANDONADI et al., 2015). Among the terrestrial ones are *Mesadenella cuspidata* (Lindl.) Garay, *Oeceoclades maculata* (Lindl.) Lindl. and two species of *Cyclopogon*. Among the epiphytes were *Sophronitis cernua* (Lindl.) Lindl., *Trichocentrum pumilum* (Lindl.) M.W.Chase & N.H.Williams, besides the genera *Campylocentrum*, *Maxillaria*, *Polystachia* and *Pleurothallis*, all with one species each (ZANDONADI et al., 2015). A preliminary survey of *Tillandsia* (Bromeliaceae) in the Riparian Vegetation of the Mogi Guaçu River present in FAYS, recognized eight species (SILVA et al., 2015). All these species occur in the Semidecidual Seasonal Forest, of which at least three have also been reported for Riparian Vegetation (FLORA DO BRASIL 2020 em construção, 2017). Among the recognized species is *T. mallemontii* Glaz ex Mez (SILVA et al., 2015), considered vulnerable due to its restricted geographic distribution in the State of São Paulo, exclusively in Conservation Units (MAMEDE et al., 2007).

The Brazilian Air Forces are national institutions responsible for the defense of the country and consequently for the protection of the environment, evidencing an association between national defense and environmental preservation (NUNES et al., 2012). More studies should be developed in forest fragments of FAYS, which presents considerable potential for the biodiversity conservation of the Mogi Guaçu River Basin, especially if associated with Conservation Units around, connected by ecological corridors.

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