



THE IMPORTANCE OF GALLERY FOREST FOR THE BIODIVERSITY OF NEOTROPICAL DROSOPHILIDS (INSECTA: DIPTERA) IN THE CERRADO BIOME

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INTRODUÇÃO

Biodiversity is not uniformly distributed on Earth. Among the terrestrial environments, forests are those that shelter the highest biodiversity. The heterogeneity observed in the physical environment that forests occupy, as well as the availability of microhabitats, are highlighted as determinant factors of the high biodiversity in these environments (Felfili *et al.*, ., 2001; Tanabe, 2002).

The Cerrado biome is a complex of very rich vegetal formations, which is responsible for the origin and maintenance of the highest savannic biodiversity in the world (Oliveira & Marquis, 2002). Despite occupying only 5% of the Cerrado territory, gallery forests are the vegetal formations that contribute to the highest richness of plant species, because they shelter approximately 33% of the local fanerogamic flora (Felfili *et al.*, ., 2001). This variability of vegetal species is followed by intense relationship with insects, birds and mammals responsible for the pollen and seeds transport. These forests are associated to watercourses, and in general they are forest communities surrounded by other savannic communities. In the Cerrado, gallery forests are essential refuges for the survival of fauna in the drought periods, because they possess foods and water permanently (Redford & Fonseca, 1986).

Some flies of the Drosophilidae family, in particular those of the genus *Drosophila* (Fallen), are considered excellent models for research because, in general, they are small, numerous, diverse, widely distributed and very sensitive to environmental variations (Powell, 1997). This insect family had origin in the tropical regions, about 50 million years ago (Throckmorton, 1975), and nowadays it has more than 3,900 described species widely distributed in all regions of the planet, except in the Polar regions. These flies, however, have strong preference for forests, because great part of the species richness of this group is found in these environments (Tanabe, 2002; Tidon, 2006).

OBJETIVOS

Although tropical populations of drosophilid flies have been object of ecological studies, the richness and distribution of the Neotropical drosophilid species are still poorly known when compared to the knowledge about the Palearctic species of this group (Val *et al.*, ., 1981). In order to improve the knowledge about the richness and the distribution of drosophilids in the Cerrado biome, we performed collections to characterize the drosophilid fauna associated to a gallery forest.

MATERIAL E MÉTODOS

We made twelve monthly collections of drosophilids between December 2007 and November 2008 in the ecological reserve of IBGE, located 35km South of Brasília (15°56'S /47°56'W). This reserve has 1,360ha and it is part of the complex *Gama - Cabeça de Veado*, a protected area of 10,000ha. This area is also part of the Biosphere Reserve of the Cerrado, created in 1993, by the UNESCO, in the Brazilian Federal District. At IBGE, there are five streams called Taquara, Rocador, Escondido, Pitoco and Monjolo, which together sustain 104ha of gallery forests. In the present study, we evaluated the gallery forest that accompanies the Pitoco stream.

Within the Pitoco gallery forest we used retention traps, which use pieces of banana fermented as baits to hold in chambers all drosophilids that entered them attracted by bait. For each collection, we distributed 30 retention traps among 10 vertical transect (0m, 4m and 8m height), that is, each vertical transect with three traps. These traps were kept inside the Pitoco gallery forest for three days.

In the laboratory, the drosophilids retained were separated and identified. We made the identification of the trapped flies, whenever possible, to the species level. For this purpose, we used keys, descriptions and, in the case of sibling species, analyzes of the male genitalia morphology (Freire - Maia & Pavan, 1949; Frota - Pessoa, 1954; Magalhães, 1962;

Vilela, 1983; Vilela & Bächli, 1990; Chassagnard & Tsacas, 1993). In the end, we classified the identified drosophilids into two species groups: exotic and endemic species of the Neotropical Region, and the representivity of each group was accessed by their species percentage. We deposited voucher specimens in the collection of the *Laboratório de Biologia Evolutiva* of the *Instituto de Ciências Biológicas* of the *Universidade de Brasília*.

RESULTADOS

In the Cerrado biome context, this was the most expressive taxonomic survey ever done for drosophilids. In the current study, 61 species were collected and identified into seven recognized genera (*Amiota*, *Drosophila*, *Neotanygrastrella*, *Rhinoleucophenga*, *Scaptodrosophila*, *Zaprionus* and *Zygothryca*) and two undetermined genera of the Drosophilidae family. *Drosophila* was the most representative genus, with 46 recognized species and five unidentified species. This species richness represents about 50% of all drosophilid species known for the Cerrado biome (Blauth & Gottschalk, 2007; Chaves & Tidon, 2008; Mata *et al.*, 2008; Roque & Tidon, 2008), and based on previous taxonomic surveys, our study registered seven new drosophilid occurrences: *Amiota filipes* for the Neotropical region, *Drosophila neorepleta* for South America, and *D. coffeata*, *D. prosimilis*, *D. pseudosaltans*, *D. saltans* and *Rhinoleucophenga brasiliensis* for the Cerrado biome. The unidentified genera of this family, as well as the five undetermined species of *Drosophila*, are being evaluated and they might represent new records or even new genus and species for the Cerrado biome.

In biodiversity surveys, new species records are important indicators of undersampled communities. Moreover, detailed information about species richness is essential to develop management strategies for biodiversity conservation (Riede, 2000). It is widely recognized that the knowledge about biodiversity, mainly in the tropics, is severely restricted. Although there have been an increasing effort to improve sampling data sets to provide information on biodiversity, there are still immense gaps to be covered. In fact, these problems will only be solved through the adoption of different sampling strategies, as well as long - term studies. Gallery forests are considered diversity centers for the Cerrado biome, since most vegetable and animal species are exclusively found in these environments (Ribeiro, 1998). The high biodiversity found in these areas has been associated to environmental heterogeneity, and to resource availability for breeding and feeding sites, which are mainly related to the appropriate environmental conditions that these areas have. Since 75,4% of the 61 drosophilid species identified here are endemics of the Neotropical Region, and only 11,5% are exotic, we also suggest that such environments are important areas for the maintenance of natural drosophilid populations of the Cerrado biome.

Conservation areas aim to protect, to preserve and to restore the biologic diversity in natural ecosystems. In the present study, albeit being performed in a single gallery forest of a protected area, the number of species, as well as the new occurrences found during this study, was extremely high for arguing that such protected area carry out

their conservationist purposes and for suggesting the protection of biological resources in similar environments still unprotected.

CONCLUSÃO

We showed that gallery forests are important areas for the maintenance of natural drosophilid populations of the Cerrado biome and that this high biodiversity is mainly related to environmental heterogeneity that these areas have.

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