

Zaprionus indianus Gupta, 1970 (Diptera: Drosophilidae) is from Africa, and their first record in the American continent was in 1999 in a metropolitan area in São Paulo city, State of São Paulo, Brazil (Vilela, 1999). Since this time the species has expanded quickly to Brazil (Santos *et al.*, 2003; Tidon *et al.*, 2003).

In May 2008 *Z. indianus* was registered for the first time in the URUCU Petroleum Province in the Amazon forest, Coari city, state of Amazonas, North of Brazil. The area is composed by a primary forest matrix with several clearings for wells and extraction, opened by the Petroleum Brazilian Company.

Drosophilids have been monitored in URUCU area since 2003 (Lima *et al.*, 2008). In this six years of monitoring were realized nine expeditions, with 476 samples in forest and clearing habitats. *Z. indianus* was collected with specific traps (Martins *et al.*, 2008) with banana baits exposed in clearings. Until now no *Zaprionus* was collected in traps in the interior of primary forest.

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First record of *Zaprionus indianus* (Diptera, Drosophilidae) in Fernando de Noronha, an Oceanic Island of Pernambuco State, Brazil.

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Introduction

Zaprionus indianus is an invader species in Brazil and America. It is the most common fly of the genus in the African continent, and it probably originated from the Afrotropical zone (Tsacas, 1985). *Zaprionus indianus* represents one of the most successful colonizing species of this genus (Chassagnard and Tsacas, 1993) and their first occurrence in Brazil was recorded in 1999, in São Paulo State (Vilela, 1999; Tidon *et al.*, 2003). Since then the species has been able to successfully colonize the whole Brazilian territory (review in Gottschalk *et al.*, 2008) and become one the most abundant species of drosophilids in open and disturbed areas (Tidon *et al.*, 2003; Silva *et al.*, 2005). In Pernambuco State, northeast of Brazil, this species was collected for the first time in April, 2000, in the cities of Recife and Bezerros (Santos *et al.*, 2003). Between June 2000 and August 2002 these authors also collected *Z. indianus* in seven other cities of Pernambuco, and in Paraíba and Bahia States. The aim of the present study is to contribute to the knowledge of the process of colonization of *Z. indianus* in north-eastern Brazil, where the drosophilid fauna is very poorly studied and only a few species have been recorded. We present here the first data of collections of *Z. indianus* in one

oceanic island (Fernando de Noronha) of Brazil, distant 360 km from the Natal city, and 525 km from Recife city, on the mainland.

Materials and Methods

In September 2009 fly samples were collected in five different environments of Fernando de Noronha Island (03°50'81.1"S/32°25'07.4"W), in Pernambuco State, Brazil. Fernando de Noronha is the most important island of the archipelago of the same name, whose area is 26 km². Fernando de Noronha island is the only inhabited island in the archipelago, and its area is 17 km². Part of it (60%) comprises the National Marine Park of Fernando de Noronha, which protects the only occurrence of oceanic mangroves of the South Atlantic Ocean, formed by the plant species *Laguncularia racemosa*.

The environments chosen to be sampled were the Mangrove of Sueste Beach (inside the National Park of Fernando de Noronha), three disturbed forests (one next to the Mangrove, one next to Morro do Pico, and one next to Estrada Velha do Porto), and an urbanized area in Vila dos Remédios, the most densely populated site of the island. Sixty retention traps with fermented banana were prepared according to Tidon and Sene (1988). On each collection site, traps were dispersed along the area 10 meters away from each other and were set on three days to provide a total of 72 h of sampling. After this time, the captured flies were transferred to small vials containing standard culture medium and transported to the laboratory of the *Universidade Federal de Pernambuco* (UFPE) for identification. Samples of the specimens analyzed were deposited in the Drosophilidae Collection of UFPE.

Results and Discussion

A total of 20,486 drosophilid flies were collected in Fernando de Noronha Island. Among these flies, 221 were *Zaprionus indianus* (Table 1), comprising 1.1% of the total samples. The relative frequencies of *Z. indianus* along the five collection sites ranged between 0.08% and 3.42%. Because of the low frequencies, our data probably indicate a very recent event of colonization of the island by *Z. indianus*. This is because our recent data indicate that *Z. indianus* is a very frequent species in collections carried out in open formations (as Caatinga biome for example), mangrove or in disturbed forests, in Pernambuco State in the mainland (unpublished results).

Table 1. Description of the five sites sampled in Fernando de Noronha Island and absolute abundance (N) and relative frequency (%) of *Zaprionus indianus* and other drosophilid species collected in each site.

| Sites of collection | | Habitat | Traps | <i>Zaprionus indianus</i> N (relative frequency) | Other species N |
|--------------------------|-----------------------------|------------------|-------|---|--------------------|
| National Park | Mangrove of Suape Beach | oceanic mangrove | 25 | 5 (0.08 %) | 5882 |
| | Forest next to the mangrove | disturbed forest | 10 | 9 (0.29 %) | 3085 |
| Protection Area (APA) | Morro do Pico | disturbed forest | 10 | 54 (0.79 %) | 6853 |
| | Estrada Velha do Porto | disturbed forest | 10 | 105 (3.42 %) | 3065 |
| | Vila dos Remédios | urbanized area | 05 | 48 (2.99 %) | 1601 |
| | | | Σ=60 | Σ=221 | Σ=20486 |

Also in Fernando de Noronha, there was a clear preference of *Z. indianus* for the environments of disturbed forests and urbanized area in relation to the environments of mangrove and adjacent forest, where only 14 individuals were collected. Our results are the first record of *Z. indianus* in an oceanic island in Brazil, 360 km far from the coast. The data reinforce the idea that *Z. indianus* has great dispersion and colonization capacities. The continuous analysis of drosophilids in Fernando de Noronha at this time of the process of colonization may clarify, in the future, the role of this invasive species in the dynamics of other exotic and native species already established on the island for a long time.

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Diversity and geographical distribution of *Drosophila* (Diptera, Drosophilidae) in Ecuador.

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Introduction

Ecuador, with an area of only 256,370 km², is one of the ten most mega-diverse countries in the world (Coloma and Ron, 2001). The latitudinal position, the presence of the Andes Mountains, and the influence of ocean currents of the Ecuadorian coast have produced a wide variety of habitats with a unique flora and fauna.

The first records of the genus *Drosophila* in Ecuador were made by Becker (1919), who reported the results of the entomological collections made by Ribet in the early 18th century in Ecuadorian highlands or Sierra. In 1957, Wheeler recorded species of the *flavopilosa* group around the Cotopaxi Volcano. In 1983, Carson and colleagues made a taxonomic survey of *Drosophila* in the Galápagos Islands. Until then, *Drosophila* records were the result of sporadic collections.

In 1987, studies were initiated to evaluate the Ecuadorian *Drosophila* diversity with the work of G. Arcos (1989), Rafael and Arcos (1988, 1989), Rafael *et al.* (2000a, b), Rafael and Vela (2000, 2003), Vela and Rafael (2001, 2003, 2004a, b, c, 2005a, b), Acurio *et al.* (2002), Rafael (2007), and Acurio (2007). Currently, 16 provinces belonging to 4 geographical regions, Coast, Sierra, Amazon, and the Insular Region, have been sampled (Figure 1).