All these results demonstrated that there is higher activity for all allozyme loci analyzed in the thorax and abdomen, and that removing wings and aedeagus for morphometric analyses did not modify the detection of the allozyme loci in the gel. No locus depicted activity specific of the head, indicating that this body part could be used for DNA extraction for further nuclear and mitochondrial molecular markers studies. It was possible to observe that the allozymatic activity is much more affected by the sample quality (how many times it was defrosted? How long took the identification after collection or the manipulation before electrophoresis?) rather than the body part separation.

Thus, the specimens of *Drosophila maculifrons* and *D. ornatifrons* can have the body parts separated to be used in different analyses without interfering with the quality of the obtained data. This makes the work easier as it diminishes the need to collect many individuals and/or to perform several collection trips to the same area, therefore, maximizing the sample utilization obtaining results for several different markers (morphological and molecular) from the same sample. The possibility to investigate the same individual for different markers and, therefore, to perform a combined analysis, yields to respond to biological questions more efficiently and also contributes to wider investigations about the evolutionary history, population structure, and conservational aspects of the studied organisms.

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Sampling two species of the *Drosophila guarani* group in a fragment of Araucaria Forest: testing different types of baits, fermentation time, and period of the day.

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Abstract

Most of the phylogenetic relationships within the *Drosophila guarani* group still remain unclear and recent studies have been conducted with this aim. Thus, work that could indicate the distribution area and the best way to collect species of this group are very important. The aim of this work was, therefore, to test the best period of the day to collect two species of the *Drosophila* *guarani* group, *D. ornatifrons,* and *D. maculifrons*, in a fragment of Araucaria Forest (Mixed Ombrophylous Forest) from Southern Brazil, offering two different types of baits and along several days. Our results showed that the presence/absence of orange in the bait is not important to collect both species; the best period of the day to perform a collection is after 9:00 am and before 12:00 pm; and the time of fermentation did not interfere as the bait was equally attractive during all the 96 hours after the experiment was set up.

Introduction

Some ecological studies with *Drosophila* have been carried out, especially regarding fly activity during the day (Klaczko *et al*., 1983), the appropriate period of the day for sampling (Pavan *et al*., 1950; Belo and Oliveira-Filho, 1978), spatial distribution of species (Burla *et al*., 1950; Dobzhanzky and Pavan, 1950; Pavan, 1959; Sene *et al*., 1981; Kratz *et al*., 1982; Tidon-Sklorz and Sene, 1992), comparison among areas (Medeiros and Klaczko, 2004; Mateus *et al*., 2006), applications for conservation biology (da Mata *et al*., 2010), and resource and breeding availability (Roque *et al*., 2010; Valadão *et al*., 2010).

In this work a collection of two *Drosophila guarani* group species, *D. maculifrons* and *D. ornatifrons*, was performed in a fragment of Araucaria Forest (Mixed Ombrophylous Forest) in Southern Brazil, aiming to test the best period of the day to obtain these species, offering two different types of baits for five days. This approach is important for further studies in any field considering species of *Drosophila guarani* group, in order to collect individuals of this group for studies in a wide range of fields, such as genetics, ecology, and evolution.

Material and Methods

This work was realized in a fragment of the Araucaria Forest biome (Mixed Ombrophylous Forest) named Parque Municipal das Araucárias (25°23'36” S, 51°27'19” W), where *Araucaria angustifolia* (Coniferae: Araucariaceae) is the predominant vegetal species. This fragment is located in the third plateau of the State of Parana, Brazil, in the subregion named Plateau of Guarapuava by Maack (1981). According to the climatic classification of Köeppen, this subregion has a humid and superhumid mesothermic climate, without dry seasons and with fresh summers. The mean temperature in the hottest months are below 22ºC. Frostings are severe and frequent, and the mean temperature in the coldest month is 12.9ºC.

The collection was performed in the spring 2010 (end of October and begining of November) using two types of baits: four traps with fermented banana and four traps with fermented banana and orange. The orange in this case was added to keep the bait more humid. These two different baits were placed in plates in the ground, alternately dispersed not less than 6 meters from each other. Twenty-four hours after the traps were set up, collections of *Drosophila* specimens using entomological nets were made every hour, initiating at 8 am and stoping at 3 pm, totalling 7 hours a day and 28 hours after 4 days.

Results and Discussion

All species of the *Drosophila guarani* group are neotropical, located in the South and Central America. *Drosophila ornatifrons* (*D. guarani* subgroup) has a wide distribution and can be found mainly in Brazil. However, some specimens were collected in Uruguay, Bolivia, and Colombia (Kastritsis, 1969; Bächli, 2010). Within the *D. guaramunu* subgroup, *D. maculifrons* also has wide distribution, mainly in the southern Latin America (Salzano, 1955).

In the Mixed Ombrophylous Forest fragment studied here, there was a much higher number of individuals of the *Drosophila maculifrons* (6054) collected than *D. ornatifrons* (77), confirming the predominance of this species in the Southern region of the South America (Salzano, 1955). It can be concluded that for the collections of *D. maculifrons* and *D. ornatifrons* specimens there is no difference between the baits used (with or without orange) and the best period of the day to collect is after 9:00 am and before 12:00 pm. Moreover, time of fermentation did not interfere as the bait was equally attractive during all the 96 hours after the experiment was set up (Table 1).

Table 1. Number of individuals of *Drosophila ornatifrons* and *D. maculifrons* collected two different types of baits, during seven hours a day, along four days, in a fragment of Araucaria Forest (Mixed Ombrophylous Forest) in the Southern Brazil. B = traps with fermented banana; O = traps with fermented banana and orange.

Time of Fermentation	*Drosophila ornatifrons*								*Drosophila maculifrons*							
	24 h		48 h		72 h		96 h		24 h		48 h		72 h		96 h	
	B	O	B	O	B	O	B	O	B	O	B	O	B	O	B	O
8:00 am	0	0	0	0	0	0	0	0	5	7	13	6	9	11	18	12
9:00 am	4	5	2	3	5	2	4	9	323	164	163	108	200	261	286	279
10:00 am	1	3	3	3	1	4	0	5	253	162	239	267	118	159	91	131
11:00 am	2	1	1	2	1	2	2	2	119	94	153	171	46	124	175	90
12:00 pm	0	1	1	1	0	1	0	0	109	117	141	105	88	85	4	33
1:00 pm	1	0	0	2	0	0	0	0	75	71	114	81	84	4	5	25
2:00 pm	1	0	0	0	1	1	0	0	104	40	65	53	27	25	20	13
3:00 pm	0	0	0	0	0	0	0	0	36	46	45	62	75	35	7	3
Total/trap	9	10	7	11	8	10	6	16	1024	701	933	853	647	704	606	586
Total/day	19		18		18		22		1725		1786		1351		1192	
Total	77								6054							

Recently, some work has been performed aiming to clarify the phylogenetic relationships within the *D. guarani* group (Remsen and O'Grady, 2002; Robe *et al*., 2002; Yotoko *et al*., 2003; DaLage *et al*., 2007). Thus, this work is important to contribute with information about the distribution and the best method to collect individuals of the species of this group.

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Climatic adaptations of life-history traits in *Drosophila melanogaster*: analysis of genetic and plastic effects.

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Abstract

Five Indian geographical populations of *Drosophila melanogaster* were analyzed for their genetic divergence of life history traits. Clinal variations were observed for body weight, ovariole number, and four pre-life history traits (*i.e.*, fecundity, hatchability, viability, and duration of development). Rearing populations at different growth temperatures shows that the variations among wild flies are likely to reflect variations in the environmental conditions under which they developed. The results of cold assay suggest that the northern populations were cold resistant as compared to southern populations. Significant correlations of the mean monthly coefficients of variation of temperature with these fitness related traits can best explain the observed clinal variations under natural selection. Key words: *Drosophila melanogaster*, body weight, ovariole number, fecundity, hatchability, viability, duration of development, cold assay.

Introduction

Along geographical gradients, variations in fitness related traits reflect evolutionary response to selection pressures imposed by changing climatic conditions (Endler, 1986; Powell, 1997; Hedrick, 2005). Latitudinal clines for ovariole number in *Drosophila melanogaster* populations from the European-African transect (Lemeunier *et al.*, 1986) and for developmental time in Australian populations (James *et al.*, 1995; James and Partrige, 1995) suggest the role of natural selection.

Extreme environmental conditions and stresses can have negative significant effects on physiological as well as life history traits of organisms. Analysis of such stressful conditions is a major focus in the development of the understanding of ecological adaptations and biogeographical distribution of a species (Karan and David, 2001). Genetic studies of life history traits and fitness characters are generally made in the laboratory (Delpuech *et al.,* 1995), and phenotypic plasticity is often considered as an unwelcome noise (Coyne and Beecham, 1987; Falconer, 1989). When investigations are made in different environments, however, a significant genotype-environment interaction is often seen (Gibert *et al.,* 1998).

Latitudinal clines for ovariole number in *Drosophila melanogaster* populations from the Europian-African transect (Lemeunier *et al.*, 1986) and for developmental time in Australian populations (James *et al.*, 1995; James and Partrige, 1995) suggest the role of natural selection.