

STUDY OF A COMMUNITY OF FLIES AT DIFFERENT ALTITUDES IN THE SERRA OF CALDAS NOVAS PARK, GOIÁS, BRAZIL

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Received March 22, 2005 – Accepted April 19, 2005 – Distributed August 31, 2006

Flies included in the infra-order Muscomorpha (Guimarães *et al.*, 2001) have medical and veterinary importance since they may produce myiasis and act in carrying pathogens to man and animals (Ferreira, 1978; Marcondes, 2001). They have been found to carry more than 100 species of disease-causing organisms such as bacteria, protozoa and helminths (Greenberg, 1971). The aim of the present study is to analyze the type of substrate utilized by and the influence of altitude variation on synanthropic flies.

The study was conducted from August 2003 to July 2004 in the Serra de Caldas Novas Park, located within the municipality of Caldas Novas, state of Goiás (17° 44' S" and 48° 37' W). Adult flies were collected by means of traps constructed using cans of matt black color, measuring around 19 cm in height by 9 cm in diameter. These had two slat-type openings located in the lower third of the cans to allow insects to enter. Nylon funnels were attached to the tops of the cans with their narrow bases pointing downwards into the cans. The upper, wide ends of the funnels were open and had plastic bags wrapped around them. The flies were collected by removing these plastic bags containing the flies. Human feces, fish, bovine liver, chicken and fruit served as bait for attracting the flies. These were deposited inside the cans, on a layer of earth. Ten traps were used at the altitude of 740 m (17° 46' 04" S and 48° 39' 35" W) and ten at the altitude of 1,000 m (17° 46' 52" S and 48° 41' 14" W). There were two traps for each type of bait, and these traps were hung on trees at a height of one meter above the ground and two meters from each other. The insects collected were taken to the laboratory, killed using ethyl ether and conserved in 70% alcohol for subsequent identification.

To obtain the flies, the contents of the traps were placed in plastic containers with a layer of sand to serve as a substrate for pupation of the larvae.

The sand was sifted 15 days after the traps were placed in the field, and the pupae were extracted from the sand and then placed individually in gelatin capsules (number 00) to obtain the flies. The flies' preferences for altitude and substrates were tested using ANOVA, with the data transformed to $\sqrt{x + 0.5}$, using a 5% significance level.

Between August, 2003 and July, 2004, a total of 2,946 flies were collected, of which 1,255 were from an altitude of 740 m and 1,691 from an altitude of 1,000 m (Table 1). The flies did not present any preference between the traps placed at the altitudes of 740 m and 1,000 m ($F = 0.16$; $P = 0.6949$), probably due to the proximity of the traps to each other.

The altitude of 1,000 m presented greater richness of species (13 species collected) and abundance of flies (57.4% of the flies collected), in comparison with the altitude of 740 m. This was possibly because of the diversity of resources at this altitude. Recent studies on parasitoids have demonstrated different distribution patterns and richness when considering the altitude gradient (Shimbori *et al.*, 2003).

At 740 m the most frequently found species was *Oxysarcodexia thornax* (Walker) (Diptera: Sarcophagidae), accounting for 42.4% of the individuals collected. In Itumbiara, state of Goiás, this species has been collected from bovine liver and feces (Marchiori *et al.*, 2000; 2000a).

At 1,000 m, the most frequently found species was *Peckia chrysostoma* (Wiedemann) (Diptera: Sarcophagidae), accounting for 27.6%. *Peckia chrysostoma* is a synanthropic species found in various parts of the world (Ferraz, 1995). In Rio de Janeiro, this species demonstrated a preference for locations inhabited by man, and fish was the bait that presented the greatest attraction (D'Almeida, 1984).

TABLE 1
Synanthropic flies collected at the altitudes of 740 and 1,000 m, from different substrates in the Serra de Caldas Novas Park, state of Goiás from August 2003 to July 2004.

Altitude/Family/Species	Substrate					
	Feces	Liver	Chicken	Fruit	Fish	Total
Altitude of 740 m:						
Calliphoridae:						
<i>Chrysomya albiceps</i>	10	30	0	0	4	44
<i>Chrysomya megacephala</i>	1	0	0	0	0	1
Drosophilidae:						
<i>Drosophila</i> sp.	0	0	0	141	0	141
Fanniidae:						
<i>Fannia pusio</i>	236	0	0	0	0	236
Muscidae:						
<i>Brontaea</i> sp.	1	0	0	0	0	1
<i>Musca domestica</i>	2	0	0	0	0	2
Sarcophagidae:						
<i>Oxysarcodexia thornax</i>	169	166	0	0	197	532
<i>Peckia chrysostoma</i>	138	0	160	0	0	298
Total	557	196	160	141	201	1255
Altitude of 1000 m:						
Calliphoridae:						
<i>Chrysomya albiceps</i>	92	0	82	0	51	225
<i>Chrysomya megacephala</i>	0	0	58	0	0	58
Drosophilidae:						
<i>Drosophila</i> sp.	0	0	0	66	0	66
Fanniidae:						
<i>Fannia pusio</i>	71	67	0	0	11	149
Muscidae:						
<i>Brontaea</i> sp.	10	0	0	0	0	10
<i>Musca domestica</i>	130	0	61	0	0	191
<i>Ophyra</i> sp.	74	25	23	0	0	122
<i>Synthesiomya nudiseta</i>	57	0	0	1	0	58
Phoridae:						
<i>Megaselia scalaris</i>	0	114	0	0	0	114
Sarcophagidae:						
<i>Oxysarcodexia thornax</i>	0	17	101	0	16	134
<i>Peckia chrysostoma</i>	117	99	62	0	189	467
<i>Sarcodexia lambens</i>	50	0	0	10	36	96
<i>Squamatoides trivittatus</i>	0	0	0	0	1	1
Total	601	322	387	77	304	1691
TOTAL	1158	518	547	218	505	2946

With regard to altitude preference, none of these species presented any difference between the traps installed at 740 m ($F = 0.86$; $P = 0.5985$) and 1,000 m ($F = 1.54$; $P = 0.3313$). These flies did not also present any preference between the substrates

at 740 m ($F = 0.40$; $P = 0.9314$) and 1000 m ($F = 0.77$; $P = 0.7179$).

According to Shimbori *et al.* (2003), each parasitoid genus (Braconidae) is influenced by altitude in a different manner. This demonstrates the

complexity of the factors involved in variations due to altitude, in addition to the other environmental factors that are not directly related, such as human influence. This is probably what occurs in the case of synanthropic flies.

REFERENCES

- D'ALMEIDA, J. M., 1984, Sinantropia de Sarcophagidae (Diptera) na região metropolitana do Estado do Rio de Janeiro. *Arq. Univ. Fed. Rur. Rio de J.*, 7: 101-110.
- FERRAZ, M. V., 1995, Larval and pupal periods of *Peckia chrysostoma* and *Adiscochaeta ingens* (Diptera: Sarcophagidae) reared under laboratory conditions. *Mem. Inst. Oswaldo Cruz*, 90: 611-614.
- FERREIRA, M. J. M., 1978, Sinantropia de dípteros muscóides de Curitiba, Paraná: Calliphoridae. *Rev. Bras. Biol.*, 38: 445-454.
- GREENBERG, B., 1971, *Flies and disease – ecology, classification and biotic association*. Princeton University Press, New Jersey, 856p.
- GUIMARÃES, J. H., UCCI, E. C. & BARROS-BATTESTI, D. M., 2001, *Ectoparasitos de importância veterinária*. São Paulo: Plêiade/FAPESP, 218p.
- MARCHIORI, C. H., CASTRO, M. E. V., PAIVA T. C. G., SILVA C. G. & TEIXEIRA, F. F., 2000, Dípteros muscóides de importância médica e veterinária e seus parasitóides em Goiás. *Arq. Bras. Med. Vet. Zootec.*, 52: 350-353.
- MARCHIORI, C. H., SILVA, C. G., CALDAS, E. R., VIEIRA, C. I. S., ALMEIDA, K. G. S., TEIXEIRA, F. F. & LINHARES A X., 2000a, Dípteros muscóides associados com carcaça de suíno e seus parasitóides em área de pastagem e de mata em Goiás. *Arq. Bras. Med. Vet. Zootec.*, 52: 459-460.
- MARCONDES, C. B., 2001, *Entomologia Médica e Veterinária*. Editora Atheneu, São Paulo, 432p.
- SHIMBORI, E. M., YAMADA, M. V., PENTEADO-DIAS, A. M., 2003, Estudo da comunidade de Braconidae (Hymenoptera: Insecta) em diferentes altitudes no Parque Estadual do Jaraguá, *Anais do 16ª Reunião Anual do Instituto Biológico*, São Paulo, Brasil, 630p.

