

SYNANTHROPY OF *OPHYRA* SPP (DIPTERA, MUSCIDAE) IN PELOTAS, RS, BRAZIL

P.R.P. Costa¹, R.L. Franz², E.E.S. Vianna³ & P.B. Ribeiro¹

¹Departamento de Microbiologia e Parasitologia, IB, UFPel. Cx. Postal: 354, CEP: 96010-900, Pelotas, RS, Brasil.

²FURG, Rio Grande, RS, Brasil.

³Departamento de Ação Sanitária, SMSBE, Prefeitura Municipal de Pelotas, RS, Brasil.

SUMMARY: Aiming to estimate the synanthropic index of *Ophyra* spp in Pelotas, State of Rio Grande do Sul, and the substrate preference for either beef liver or decomposing poultry offal used as bait, Wind Oriented Traps (W.O.T.) were used. Six traps were set up, two of which in the urban area, one baited with beef liver and the other with poultry offal, the same procedure being carried out for rural and sylvatic areas. It was verified that the genus *Ophyra*, represented by the species *O. aenescens*, *O. albuquerquei*, *O. solitaria* and *O. chalcogaster* represent 2,03% of a total of 226.431 dipterans captured, showing positive synanthropic indexes and preference for decomposing beef liver.

KEYWORDS: *Ophyra* spp, Muscidae, Synanthropy.

INTRODUCTION

The dipterans of the genus *Ophyra* (Muscidae, Azeliinae) are insects that go through complete metamorphosis, then, with the developmental stages of egg, larva, pupa and adult. They are usually associated with poultry and pig raising facilities, city dumps, having no evident domiciliary habits.

In Brazil, with expanding and economically important poultry and pig industries, it is increasingly necessary the knowledge, especially of the coprophagous dipterofauna, under the aspects of biology and behavior of synanthropic flies. In the same manner, new products, surveys and natural enemy ecological studies, selecting promising species as agents for biological control, associated with husbandry and chemical insecticides, will constitute alternatives for integrated control.

BROCE *et alii* (1977) idealized a fly trap which was called W.O.T. (Wind Oriented Trap). The trap opening is constantly oriented toward the wind, with the objective of using the strong orientation of the flies toward the attractant. OLIVEIRA (1980), aiming at facilitating the construction of the trap without operational impairment, modified the original model using a single larger aluminum wing.

GUIMARÃES (1983) observed that the genus *Ophyra* is frequently found in poultry facilities, although not representing significant public health hazard.

GUIMARÃES (1985) mentioned that some poultry facilities in the State of São Paulo might produce as much as 2000 tons of

feces per month, which are marketed as organic fertilizers. This substrate is excellent for development of synanthropic flies, which apart from constituting a threat for human and animal health frequently contaminate hens' eggs through regurgitation and feces. This problem has increased over the last years because part of the population of dipterans is carried to urban areas, and it is so serious that it is almost impossible to live or work in a 15 km radius from the facilities.

NOLAN III & KISSAM (1987), monitoring the population of *O. aenescens* in poultry facilities verified that even at high frequencies at the ((((())), the population is almost insignificant at 300-400m, concluding that its use in the strategy for control of *Musca domestica* is acceptable, because its migration into human dwellings is minimal.

D'ALMEIDA (1988) observed in the urban area of Rio de Janeiro, the frequency of *O. solitaria* in human feces (39,36%), bovine liver (32,47%), shrimp (24,56%), crab (3,01%), fish (0,57%); and the frequency of *O. aenescens* in fish (36,62%), crab (35,29%), bovine liver (25,0%) and shrimp (3,67%).

GEDEN *et alii* (1988) observed that in laboratory assays a third stage *O. aenescens* larvae destroys 7 to 18 *Musca domestica* larvae per day.

CARRERA (1991) registers that muscids of the genus *Ophyra* are attracted by fermenting corpses with amoniacal emanations, thus having some importance in forensic medicine.

SKIDMORE (1985) mentioned that some *Ophyra* species, belonging to the sub-family Azeliinae, are facultative or obligatory carnivores in the larval phase.

Considering the importance of the species of the genus *Ophyra* and the possibility of their use in the control of *Musca domestica*, the present work was carried out with the aim of identifying the species and estimating the synanthropic index, in the city of Pelotas, comparing also the attractive effect of bovine liver and decomposing chicken offal for the capture of this species.

MATERIALS AND METHODS

In order to estimate the synanthropic index of the species of the genus *Ophyra* six wind oriented traps (W.O.T.) were used, all of them built according to BROCE *et alii* (1977) and modified by OLIVEIRA (1980). Three of the traps were baited with bovine liver and the others with decomposing poultry offal.

The traps were distributed in three ecological environments, with the following features:

Urban area – With two traps, set up in the area of the 9th Motorized Infantry Battalion Headquarters, located at Duque de Caxias Avenue, Fragata District, about 2,5km from downtown Pelotas.

Rural area – With two traps set up at the UFPEL Campus, close to scattered houses and areas modified by man to raise domestic animals.

Sylvatic area – Also with two traps set up in a primary forest, located at the Center for Lowland agricultural Research, formed by tall and medium-sized trees, shrubs and grasses. In each environment, one of the traps contained beef liver as bait and the other contained poultry offal.

The bait, before being used, was left at room temperature for a period of five to seven days. Thereafter, with enough moisture, it was placed individually into the traps, inside a plastic container measuring 10 cm in diameter and 7 cm in depth. Every 10 days, 50% of the bait was renewed so that the attractive components were refreshed, and their decomposition and moisture status were observed. The traps remained set up from April, 1993 to March, 1994, suspended in trees 1,2m above the ground, each distant 300m from the other. All captured dipterans were removed from the traps twice weekly, simultaneously from the three ecological areas, after being killed by pyrethroid aerosols, then placed into flasks separated by trap and location, and taken to the laboratory for identification and counting.

The identification of the species of the genus *Ophyra* was based on the work of PAMPLONA & COURI (1989) and the synanthropic index was estimated according to NUORTEVA (1963). Except for the species of *Ophyra*, the other dipterans captured were considered as “other dipterans”.

RESULTS

During the experimental period 226.431 dipterans were captured in the six W.O.Ts. used; 2,03% of those belonged to

the genus *Ophyra* with four species, and the remaining were dipterans of the families Calliphoridae, Muscidae, Sarcophagidae, Fannidae and Anthomyiidae.

The frequencies of the respective species are represented in Table 1 where it is established that *O. aenescens* is most frequent with 0,82%, followed by *O. albuquerquei* with 0,66%, representing 1,48% of the total captured dipterans. *O. solitaria* was less frequent, with 0,02%.

The synanthropic index of *Ophyra* spp. expressed in Figure 1 for *O. solitaria* and *O. chalcogaster* was +58,10 and +49,75, respectively, with preference for the rural area, while *O. aenescens*, with a synanthropic index of +18,55 shows independence for inhabited areas; *O. albuquerquei*, on the other hand, has a synanthropic index of –30,75, with preference for uninhabited areas.

In Table 2 it is observed that with the exception of *O. albuquerquei* which occurred most frequently in the sylvatic area with 57,1%, the other species were captured with higher frequency at the rural area, with *O. aenescens* representing 62,7%. It is noteworthy that most of the dipterans were captured in the rural zone (39%), followed by the urban area with 36,5%.

Regarding the preference for bait, independent of zone, Table 3 shows that *O. aenescens* and *O. albuquerquei* preferred beef liver, while *O. solitaria* preferred poultry offal; *O. chalcogaster*, on the other hand, showed no preference for the two types of bait used.

In Table 4 is registered the preference for bait of the different species in the urban area. *O. chalcogaster* and *O. aenescens* preferred poultry offal and *O. solitaria* beef liver, while *O. albuquerquei* showed no evident preference.

Observing the frequency for different baits in the rural area (Table 5), it is verified that with the exception of *O. solitaria*, which showed absolute preference for poultry offal, the other species preferred beef liver, with similar results in the (()) zone (Table 6).

Comparing the frequency of species of the genus *Ophyra*, captured with beef liver in the three ecological zones, it is observed in Table 7 that *O. chalcogaster* and *O. aenescens* were most frequent in the rural area, while *O. albuquerquei* was most frequent in the sylvatic area, and *O. solitaria* in the urban area. When poultry offal was used, *O. aenescens* and *O. solitaria* were most frequent in the rural area (Table 8), while *O. chalcogaster* showed a very low frequency in the sylvatic area, with practically no difference between urban and rural areas. On the other hand, frequencies for *O. albuquerquei* did not differ among the three ecological areas.

DISCUSSION

The low frequency of *Ophyra* spp is possibly due to the fact that they are carnivore muscids, according to D'ALMEIDA (1988), GEDEN *et alii* (1988), CARRERA (1991) and SKIDMORE (1985), associated to the small dispersion capacity and availability of substrate for larval development, together with

Table 1. Frequency of *Ophyra* spp, captured in W.O.T. traps, baited with beef liver and poultry offal, in the period from April/93 to March/94, in Pelotas, RS.

Species	Absolute frequency	Relative frequency (%)
<i>Ophyra chalcogaster</i>	1194	0,53
<i>Ophyra aenescens</i>	1858	0,82
<i>Ophyra albuquerquei</i>	1507	0,66
<i>Ophyra solitaria</i>	37	0,02
Total <i>Ophyra</i>	4595	2,03
Other Diptera	221835	97,97
Total Diptera	226431	100,0

Table 2. Frequency of *Ophyra* spp, captured in W.O.T. traps in three ecological areas, in the period from April/93 to March/94, in Pelotas, RS.

Species	Relative frequency (%) among the ecological areas		
	Urban	Rural	Sylvatic
<i>Ophyra chalcogaster</i>	37,6	49,7	12,7
<i>Ophyra aenescens</i>	12,3	62,7	25,0
<i>Ophyra albuquerquei</i>	13,4	29,5	57,1
<i>Ophyra solitaria</i>	40,5	51,4	8,1
Total <i>Ophyra</i>	18,9	48,7	32,4
Other Diptera	36,9	38,8	24,3
Total Diptera	36,5	39,0	24,5

Table 3. Frequency, for each bait, of *Ophyra* spp, captured in W.O.T. traps independent of ecological area, in the period from April/93 to March/94, in Pelotas, RS.

Species	Baits			
	Beef liver		Poultry offal	
	Absolute	Relative (%)	Absolute	Relative (%)
<i>Ophyra chalcogaster</i>	636	53,27	558	46,73
<i>Ophyra aenescens</i>	1237	53,27	558	46,73
<i>Ophyra albuquerquei</i>	1149	88,84	159	12,16
<i>Ophyra solitaria</i>	11	29,73	26	70,27
Total <i>Ophyra</i>	3033	68,98	1364	31,02
Other Diptera	105324	47,46	116592	52,54
Total Diptera	108357	47,88	117956	52,12

Table 4. Frequency for each bait of *Ophyra* spp, captured in W.O.T. traps in the urban area, in the period from April/93 to March/94, in Pelotas, RS.

Species	Baits			
	Beef liver		Poultry offal	
	Absolute	Relative (%)	Absolute	Relative (%)
<i>Ophyra chalcogaster</i>	178	39,6	271	60,4
<i>Ophyra aenescens</i>	92	40,4	271	60,4
<i>Ophyra albuquerquei</i>	88	50,3	87	49,7
<i>Ophyra solitaria</i>	11	73,3	4	26,4
Total <i>Ophyra</i>	369	42,6	498	57,4
Other Diptera	29183	35,6	52698	64,4
Total Diptera	29552	35,7	53196	64,3

Table 5. Frequency for each bait of *Ophyra* spp, captured in W.O.T. traps in the rural area, in the period from April/93 to March/94, in Pelotas, RS.

Species	Baits			
	Beef liver		Poultry offal	
	Absolute	Relative (%)	Absolute	Relative (%)
<i>Ophyra chalcogaster</i>	355	59,9	238	40,1
<i>Ophyra aenescens</i>	760	65,2	405	34,8
<i>Ophyra albuquerquei</i>	319	69,0	143	31,0
<i>Ophyra solitaria</i>	-	-	19	100,0
Total <i>Ophyra</i>	1434	64,0	805	36,0
Other Diptera	44764	52,0	41308	48,0
Total Diptera	46198	52,3	42113	47,7

Table 6. Frequency for each bait of *Ophyra* spp, captured in W.O.T. traps in the sylvatic area, in the period from April/93 to March/94, in Pelotas, RS.

Species	Baits			
	Beef liver		Poultry offal	
	Absolute	Relative (%)	Absolute	Relative (%)
<i>Ophyra chalcogaster</i>	103	67,8	49	32,2
<i>Ophyra aenescens</i>	385	82,8	80	17,2
<i>Ophyra albuquerquei</i>	742	85,3	128	14,7
<i>Ophyra solitaria</i>	-	-	3	100,0
Total <i>Ophyra</i>	1230	82,6	260	17,4
Other Diptera	31296	58,1	22586	41,9
Total Diptera	32526	58,7	22846	41,3

Table 7. Frequency, among ecological areas, of *Ophyra* spp, captured in W.O.T. traps, baited with beef liver, in the period from April/93 to March/94, in Pelotas, RS.

Species	Relative frequency (%) among the ecological areas		
	Urban	Rural	Sylvatic
<i>Ophyra chalcogaster</i>	28,0	55,8	16,2
<i>Ophyra aenescens</i>	7,4	61,5	31,1
<i>Ophyra albuquerquei</i>	7,7	27,8	64,5
<i>Ophyra solitaria</i>	100,0	-	-
Total <i>Ophyra</i>	13,0	46,8	40,2
Other Diptera	27,8	42,5	29,7
Total Diptera	27,3	42,7	30,0

Table 8. Frequency, among ecological areas, of *Ophyra* spp, captured in W.O.T. traps, baited with beef liver, in the period from April/93 to March/94, in Pelotas, RS.

Species	Relative frequency (%) among the ecological areas		
	Urban	Rural	Sylvatic
<i>Ophyra chalcogaster</i>	48,6	42,7	8,7
<i>Ophyra aenescens</i>	21,9	65,2	12,9
<i>Ophyra albuquerquei</i>	24,3	39,9	35,8
<i>Ophyra solitaria</i>	15,4	73,0	11,6
Total <i>Ophyra</i>	31,9	51,5	16,6
Other Diptera	45,2	35,4	19,4
Total Diptera	45,0	35,6	19,4

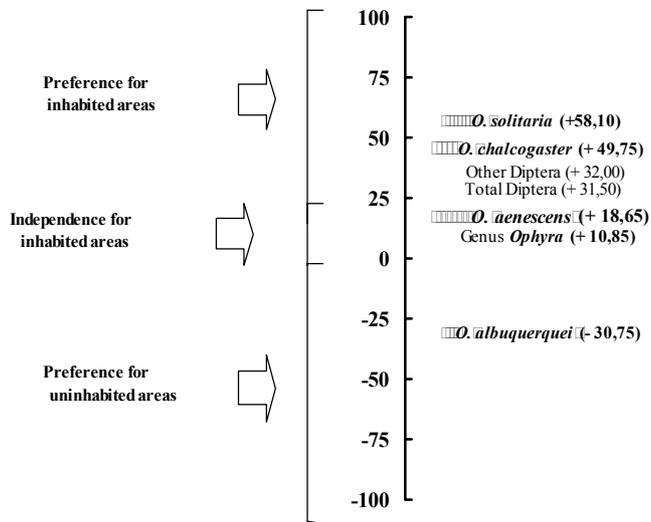


Figure 1. Annual Synanthropic index of the species of *Ophyra* captured in W.O.T. traps, in the period from April/93 to March/94, in Pelotas, RS.

the dependence of “other dipterans” for predatism and the competition with other animals.

The preference of *Ophyra* spp for beef liver (bait), is due to their carnivore habits, as mentioned above, without pronounced difference for the bait composed of poultry offal, because it contains fermenting and decomposing organic matter.

Regarding the synanthropic index, it was verified that the largest population of *Ophyra* spp is human-modified areas, certainly because of the increased food offer, direct or indirect, resulting from those modifications.

The knowledge of the biology of *Ophyra* spp is still incipient, especially in Brazil, and further studies are needed, considering the possibility of biological control of other dipterans which threat public and animal health, as well as the aspect of forensic medicine, because according to CARRERA (1991), they are attracted to decomposing corpses, in the stage of ammoniacal emanations.

SUMÁRIO

Com o objetivo de estimar o índice sinantrópico das espécies de *Ophyra* que ocorrem em Pelotas e a preferência pelos substratos, fígado bovino ou vísceras de galinha em decomposição, utilizados como iscas, instalou-se seis armadilhas W.O.T. (Wind Oriented Trap) em três áreas

ecológicas, sendo duas na área urbana, iscadas uma com fígado bovino e a outra com vísceras de galinha, o mesmo ocorrendo com a área rural e silvestre. Constatou-se que o gênero *Ophyra* representado pelas espécies *O. aenescens*, *O. albuquerquei*, *O. solitaria* e *O. chalcogaster* representam 2,03% do total de 226.431 dípteros capturados, apresentando índices sinantrópicos positivos e preferência pelo fígado bovino em decomposição.

PALAVRAS-CHAVE: *Ophyra* spp, Muscidae, sinantropia.

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