

**PREVALENCE OF DIPTEROUS FLIES  
ASSOCIATED WITH HUMAN AND ANIMAL  
DISEASES IN AL-OBOUR AND 6<sup>TH</sup> OCTOBER  
WHOLESALE MARKETS, EGYPT**

By

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**Abstract**

The present study is a survey to identify the dipterous flies associated with human and animal diseases in the two wholesale markets: Al-Obour and 6<sup>th</sup> October. The results indicated that 20824 flies belonging to 9 families, 24 genera and 31 species were trapped during the period of investigation (January-December, 2003). *Musca domestica* were the most abundant species in the two markets. Statistical analysis showed that species of the families: Calliphoridae, Milichiidae, Muscidae, Piophilidae, Otitidae, Sarcophagidae and Sphaeroceridae were significantly higher in Al-Obour than 6<sup>th</sup> October, due to spread of garbage and decaying fish.

**Introduction**

Al-Obour wholesale market (located 25 Km. from East Cairo) and the 6<sup>th</sup> October wholesale market (located 35 Km. from South Cairo) were established in 1994 & 1998 respectively, to substitute traditional wholesale markets, which had adverse effects on the environment. Both markets are designed for displaying fruits and vegetables in addition to fish at Al-Obour alone. While complementary services were incorporated

to ensure the protection of the environment from unwanted wastes which in turn cause the spread of harmful insects especially flies. Dipterous flies are among the most important insects that affect the health of human and animals. They act as vectors pathogenic organisms either mechanically or biologically (Zumpt, 1973). The majority of species breed in carrion, decaying vegetable matter from which they may carry pathogens to human food or drink or directly to the human body (Smart, 1965). Others attack the human body producing myiasis.

This work aimed to survey and identify the dipterous flies of medical and veterinary importance in the newly established wholesale markets, Al-Obour and 6<sup>th</sup> October.

### Materials and Methods

This work covered the whole year 2003. Dipterous flies were collected from the two markets during the period from January to December 2003. The collections were made by using a standard insect net around garbage accumulation, garbage boxes, or sticky traps held harm-pests changed weekly. Also, infested fruits, vegetables, fishes excreta were obtained and kept in small cages at laboratory, till emergence of adults. Identifications were carried out using keys given by Zumpt (1965); Steyskal and El-Baily (1967); Shaumer *et al.* (1977, 1985, 1989); Shaumer and Kamal (1982, 1983); Mohamed and Shoukry (1991) and Morsy *et al.* (1991).

### Results

The results are shown in tables (1 to 6) and figure (1).

### Discussion

The survey yielded a total 20824 specimens belonging to 31 species, 24 genera and 9 families, Calliphoridae, Drosophilidae, Milichiidae, Muscidae, Piophilidae, Otitidae, Sarcophagidae, Sphaeroceridae and Syrphidae. In Al-Obour sale market 17035 flies under 29 species and 23 genera were collected during the period of investigation (tab. 1), comparable to 3789 flies under

Table (1): Total number of fly species collected at Al-Obour market from January 2003 to December 2003.

species	1	2.	3	4	5	6	7	8	9	10	11.	12.
<i>Calliphora vicina</i>	0	0	3	1	0	0	0	2	1	0	0	0
<i>Chrysomyia albiceps</i>	1	2	15	16	14	3	3	19	26	10	7	2
<i>Lucilia sericata</i>	0	4	24	19	25	16	5	10	21	22	8	3
<i>Drosophila melanogaster</i>	10	4	7	9	12	10	21	13	15	11	1	2
<i>Drosophila histrioides</i>	20	9	61	23	20	9	5	4	19	14	4	1
<i>Meoneura vagans</i>	4	14	19	12	11	15	9	3	11	21	4	4
<i>Fannia canicularis</i>	0	0	1	1	2	0	0	0	3	0	0	0
<i>Hydrotaea meteorica</i>	0	2	10	2	11	3	0	0	3	2	0	0
<i>Limnophora multipunctata</i>	0	0	0	4	2	4	9	27	0	1	0	0
<i>Limnophora variegata</i>	3	1	4	10	14	20	5	7	6	1	0	0
<i>Musca domestica</i>	249	364	1218	2095	1945	161	1339	2030	4150	834	130	180
<i>Musca sorbans</i>	29	9	201	113	134	0	14	172	68	10	3	1
<i>Musca vitripennis</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Stomoxys calcitrans</i>	0	0	4	2	1	1	0	0	0	1	0	0
<i>Synthesiomia nudiseta</i>	0	0	3	1	2	0	0	0	2	0	1	0
<i>Piophilha Casie</i>	2	1	9	24	12	1	6	5	10	9	2	1

<i>Physiphora demendata</i>	0	0	4	0	0	0	24	142	28	5	1	0
<i>Parasarcophaga hirtipes</i>	6	10	5	8	21	10	15	18	7	9	19	1
<i>Ravinia striata</i>	1	3	2	2	1	1	1	3	0	1	0	0
<i>Wohlfahrtia pattoni</i>	0	0	0	1	0	0	0	0	2	0	0	0
<i>Coproica vogans</i>	13	9	31	11	3	11	4	15	49	14	12	4
<i>Cop. ferruginata</i>	1	2	0	0	3	1	2	0	4	1	1	0
<i>Copromyza costalis</i>	0	0	9	1	1	2	0	1	0	0	0	0
<i>Ceroptera algira</i>	0	2	5	6	1	3	1	0	0	1	1	0
<i>Ischtolepta pusille</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Limosina brevicostata</i>	0	0	4	2	2	4	3	2	2	1	1	0
<i>Limosina bifrons</i>	1	1	4	3	1	1	0	0	0	0	1	1
<i>Sphaerocera curvipes</i>	0	0	0	1	0	0	0	0	0	0	0	0
<i>Eristalis aenus</i>	0	0	0	0	0	0	1	0	0	0	0	0
<i>Eristalis megacephala</i>	0	0	0	0	0	2	0	0	0	0	0	0
<i>Sphaerophoria ruppellii</i>	0	0	0	1	0	0	0	0	0	0	0	0

Table (2): Total number of fly species collected at 6<sup>th</sup> October market from January 2003 to December 2003.

species	1	2	3.	4	5	6	7	8	9	10	11	12	13
<i>C. vicina</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>C. albiceps</i>	0	0	1	1	0	0	1	3	3	0	0	0	9
<i>L. sericata</i>	1	1	2	1	0	0	0	0	1	0	0	0	6
<i>D. melanogaster</i>	7	1	3	3	5	5	2	1	5	1	10	4	47
<i>D. histriooides</i>	254	11	16	4	22	2	15	10	1	3	3	0	341
<i>M. vagans</i>	11	2	24	10	2	4	1	0	4	3	0	0	61
<i>F. canicularis</i>	0	0	3	0	0	0	0	0	0	0	0	0	3
<i>H. meteorica</i>	1	6	7	1	4	1	1	16	4	4	0	0	45
<i>L. multipunctata</i>	1	1	3	1	1	1	4	2	3	3	1	2	23
<i>L. variegata</i>	1	1	2	8	11	10	13	5	2	1	0	0	54
<i>M. domestica</i>	142	178	329	325	415	310	282	149	247	129	110	139	2755
<i>M. sorbans</i>	6	2	12	15	10	9	11	4	8	7	1	0	79
<i>M. vitripennis</i>	0	0	3	0	1	0	0	0	1	0	0	0	5
<i>S. calcitrans</i>	1	0	0	0	0	0	0	0	0	1	0	1	3
<i>S. nudiseta</i>	0	0	1	0	0	0	0	2	4	9	2	0	20
<i>P. casie</i>	0	0	1	2	0	0	4	10	1	1	5	0	102
<i>P. demendata</i>	0	0	4	8	1	7	65	10	1	1	5	0	6
<i>P. hirtipes</i>	0	1	0	2	1	0	0	0	1	1	0	0	5
<i>R. striata</i>	1	0	0	0	2	0	1	1	0	0	0	0	0
<i>W. pattoni</i>	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>C. vogans</i>	2	2	40	4	6	1	3	1	24	3	7	1	94
<i>C. ferruginata</i>	1	3	1	1	1	2	0	0	0	1	3	0	13
<i>C. costalis</i>	0	0	1	1	1	0	1	1	2	0	1	0	8
<i>C. oleira</i>	1	0	4	3	1	1	0	0	1	2	2	13	28
<i>I. pusille</i>	0	0	0	2	1	0	0	0	0	0	0	0	3
<i>L. brevicostata</i>	0	2	9	1	1	0	0	2	0	1	0	0	16
<i>L. bifrons</i>	0	0	2	5	1	4	2	3	0	2	3	1	23
<i>S. curvipes</i>	0	0	2	1	0	0	0	0	0	0	0	0	3
<i>E. aenus</i>	0	0	0	0	0	0	1	1	0	0	0	0	2
<i>E. megacephala</i>	0	0	0	0	4	5	3	9	3	1	0	0	25
<i>S. ruppelli</i>	0	0	0	0	0	0	0	00	0	0	0	0	0

Table (3): Mean number of fly species collected from Al-Obour and 6<sup>th</sup> October wholesale markets.

Species	Al-Obour market X ± SEM (Min – Max)	6 <sup>th</sup> October market X ± SEM (Min- Max)
<i>Calliphora vicina</i>	0.6 + 0.3 (0-3)	0.0 + 0.0 (0-0)
<i>Chrysomya albiceps</i>	9.8 + 2.4 (1-26)	0.8 + 0.3 (0-3)
<i>Lucilia sericata</i>	13.1 + 2.6 (1-25)	0.5 + 0.2 (0-2)
<i>Drosophila melanogaster</i>	9.6 + 1.6 (1-21)	3.9 + 0.8 (1-10)
<i>Drosophila histrioides</i>	15.8 + 4.7 (1-61)	28.4 + 20.6 (0-254)
<i>Meoneura vegans</i>	10.6 + 1.8 (3-21)	5.1 + 2.02 (0-24)
<i>Fannia canicularis</i>	0.6 + 0.3 (0-3)	0.3 + 0.3 (0-3)
<i>Hydrotaea meteorica</i>	2.8 + 1.1 (0-11)	3.8 + 1.3 (0-16)
<i>Limnophora multipunctata</i>	3.9 + 2.2 (0-27)	1.9 + 0.3 (1-4)
<i>Limnophora variegata</i>	5.9 + 1.8 (0-20)	4.5 + 1.4 (0-13)
<i>Musca domestica</i>	1224.6 + 345.0 (130-4150)	229.6 + 29.2 (110-415)
<i>Musca sorbans</i>	62.8 + 21.2 (0-201)	7.08 + 1.4 (0-15)
<i>Musca vitripennis</i>	0.0 + 0.0 (0-0)	0.4 + 0.3 (0-3)
<i>Stomoxys calcitrans</i>	0.8 + 0.4 (0-4)	0.3 + 0.1 (0-1)
<i>Synthesiomyia nudiseta</i>	0.8 + 0.3 (0-3)	0.3 + 0.2 (0-2)
<i>Piophilha Casie</i>	6.8 + 1.9 (1-24)	1.7 + 0.8 (0-9)
<i>Physiphora demendata</i>	17.0 + 11.7 (0-142)	8.5 + 5.2 (0-65)
<i>Parasarcophaga hirtipes</i>	10.8 + 1.8 (1-21)	0.5 + 0.2 (0-2)
<i>Ravinia striata</i>	1.3 + 0.3 (0-3)	0.4 + 0.2(0-2)
<i>Wohlfahrtia pattoni</i>	0.3 + 0.2 (0-2)	0.0 + 0.0(0-0)
<i>Coproica vogans</i>	14.7 + 3.8 (3-49)	7.8 + 3.5(1-40)
<i>Cop. ferruginata</i>	1.3 + 0.4 (0-4)	1.1 + 0.3 (0-3)
<i>Copromyza costalis</i>	1.2 + 0.7 (0-9)	0.7 + 0.2 (0-2)
<i>Ceroptera algira</i>	1.7 + 0.6 (0-6)	2.3 + 1.03 (0-13)
<i>Ischiolepta pusille</i>	0.0 + 0.0 (0-0)	0.3 + 0.2 (0-2)
<i>Limosina brevicostata</i>	1.8 + 0.4 (0-4)	1.3 + 0.7 (0-9)
<i>Limosina bifrons</i>	1.08 + 0.4 (0-4)	1.9 + 0.5 (0-5)
<i>Sphaerocera curvipes</i>	0.08 + 0.08 (0-1)	0.3 + 0.2 (0-2)
<i>Eristalis aenus</i>	0.1 + 0.0 (0-1)	0.2 + 0.1 (0-1)
<i>Eristalis megacephala</i>	0.1 + 0.1 (0-1)	2.1 + 0.8 (0-9)
<i>Sphaerophoria ruppellii</i>	0.1 + 0.1(0-1)	0.0 + 0.0 (0-0)

28 species and 21 genera in 6<sup>th</sup> October market (tab. 2). Among the collected species *Musca domestica* L. was the most abundant in the two markets forming (0.006%) of the collected species Al-Obour wholesale market and (0.019%) in 6<sup>th</sup> October market. This result is in agreement with Amin *et al.* (1997, 1998).

Table 4: Collected dipterous flies from Al-Obour and 6<sup>th</sup> October markets.

Families	Al-Obour			6 <sup>th</sup> October		
	genus	Sp.	specimens	genus	Sp.	specimens
Calliphoridae	3	3	282	2	2	15
Drosophilidae	1	2	304	1	2	388
Milichiidae	1	1	127	1	1	61
Muscidae	6	8	15625	6	9	2977
Piophilidae	1	1	82	1	1	20
Otitidae	1	1	204	1	1	102
Sarcophagidae	3	3	147	2	2	11
Sphaeroceridae	5	7	260	6	8	188
Syrphidae	2	3	4	1	2	27
Total	23	29	17035	21	28	3789

Table (5): The collection sites of flies of the different families in the two markets.

Families	Garbage	Fermented fruits	Human & animal excreta	Decaying fish parts	Cheese
Calliphoridae	+	-	-	++	-
Drosophilidae	+	++	-	-	-
Milichiidae	+	-	++	-	-
Muscidae	++	+	++	+	+
Piophilidae	+	-	-	-	++
Otitidae	+	-	++	-	-
Sarcophagidae	+	-	-	++	-
Sphaeroceridae	+	-	++	-	-
Syrphidae	+	+	-	-	-

*Calliphora vicina* Rob. & Desv., *Wohlfahrtia pattoni* Salem and *Sphaerophoria ruppellii* Wied. were represented only in Al-Obour market by 3, 2 & 1 specimens, respectively. Meanwhile *Musca vitripennis* and *Ischiolepta pusille* (Fallen) were represented only in 6<sup>th</sup> October market by 3 and 2 specimens respectively. Concerning the total number of species belonging to each family table (4), the families could be descendingly arranged in Al-Obour market as follows: Muscidae (15625) > Drosophilidae (304) > Calliphoridae (282) > Sphaeroceridae (260) > Otitidae (204) > Sarcophagidae (147) > Milichiidae (127) > Piophilidae (82) > Syrphidae (4). However, descending arrangement of families in 6<sup>th</sup> October wholesale market was:

Muscidae (2976)> Drosophilidae (388)> Otitidae (102)> Spherooceridae (188)> Milichiidae (61)> Syrphidae (27)> Piophilidae (20)> Calliphoridae (15)> Sarcophagidae (11).

Table (6): Medical and veterinary important fly species at Al-Obour and 6<sup>th</sup> October Markets, as in James (1947); Smart (1965); Zumpt (1965) and Morsy *et al.* (1991).

Species	Medical and veterinary important
<i>Calliphora vicina</i>	Human myiasis in ear, mouth & gastro-intestinal in sheep.
<i>Chrysomya albiceps</i>	Myiasis only in diseased tissues of sheep.
<i>Lucilia sericata</i>	Wound and ear myiasis, a principal sheep maggot flies.
<i>Drosophila melanogaster</i>	Intestinal myiasis.
<i>Drosophila histrioides</i>	Intestinal myiasis.
<i>Meoneura vagans</i>	Breed in human faeces & animal excrements and contaminate food with pathogenic organisms.
<i>Fannia canicularis</i>	Intestinal, vesicular and cutaneous myiasis, causes wound myiasis in mouth and nasal region.
<i>Hydrotaea meteorica</i>	Intestinal myiasis.
<i>Linnophora multipunctata</i>	Loss of condition, lower milk yield & poor quality meat.
<i>Linnophora variegata</i>	Loss of condition, lower milk yield and poor quality meat.
<i>Musca domestica</i>	Attacks diseased tissues, and causes nasal, cutaneous & urinary myiasis. Causes cholera & diarrhoea.
<i>Musca sorbans</i>	Vectors of eye infections (Ophthalmia & corneal ulcers), transmit viral, bacterial & parasitic diseases. Larvae cause traumatic myiasis.
<i>Musca vitripennis</i>	Intestinal myiasis.
<i>Stomoxys calcitrans</i>	Wound and gastric myiasis.
<i>Synthesiomyia nudiseta</i>	Wound myiasis.
<i>Piophilidae casie</i>	Intestinal and nasal myiasis.
<i>Physiphora demendata</i>	Breed in human faeces & animal excrements, contaminate food with pathogenic organisms.
<i>Parasarcophaga hirtipes</i>	Intestinal myiasis.
<i>Ravinia striata</i>	Gastro-intestinal and wound myiasis.
<i>Wohlfahrtia Pattoni</i>	Wound myiasis.
<i>Coproica vogans</i>	Disease vector
<i>Cop. Ferruginata</i>	Develop in animal excrement, potential disease vector.
<i>Copromyza costalis</i>	Disease vector.
<i>Ceroptera algira</i>	Disease vector.
<i>Ischitolepta pusille</i>	Disease vector.
<i>Limosina brevicostata</i>	Disease vector.
<i>Limosina bifrons</i>	Disease vector.
<i>Sphaerocera curvipes</i>	Disease vector.
<i>Eristalis aenus</i>	Intestinal myiasis.
<i>Eristalis megacephala</i>	Intestinal myiasis.
<i>Sphaerophoria ruppellii</i>	Intestinal myiasis.



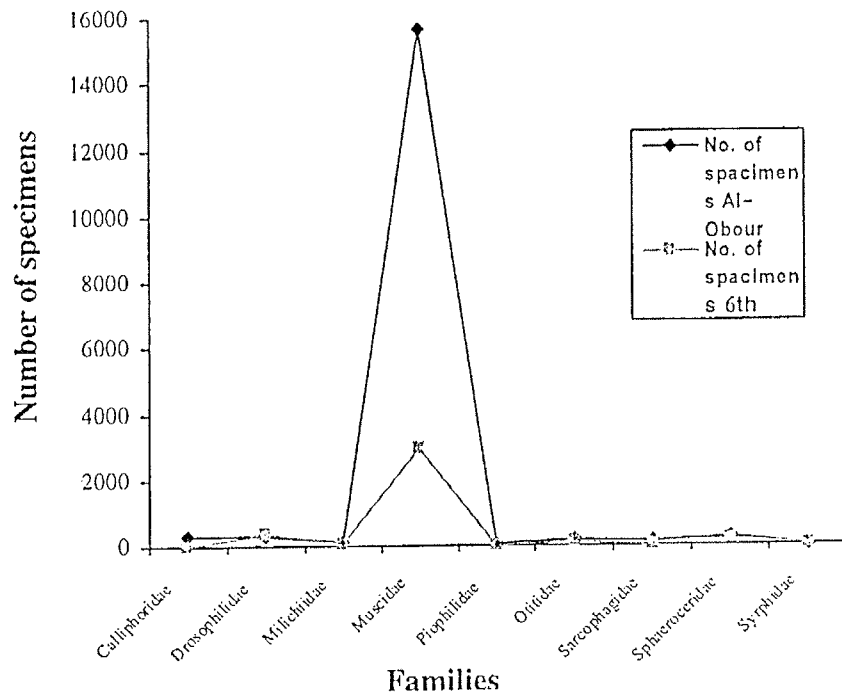


Figure (1): Number of collected dipterous flies of different families from Al-Obour and 6<sup>th</sup> October wholesale markets.

The total number of Calliphorid, Sarcophagid, Otitid and Muscid species were significantly higher in Al-Obour wholesale market than 6<sup>th</sup> October wholesale market ( $F = 132.8$ ,  $p < 0.0001$ ;  $F = 5.01$ ,  $p = 0.005$  and  $F = 130.9$ ,  $p < 0.0001$  respectively). This may be attributed to the accumulation of garbage, decaying fishes, human and animal excreta which are the most attractive matter of this species. Also, *Piophilid casie* (L.) was significantly higher in Al-Obour wholesale market due to presence of cheese salesmen ( $F = 6.4$ ,  $p = 0.002$ ). Garbage was the most attractive and breeding materials for collected flies. Accumulations of fermented fruits represented suitable breeding medium for Drosophilid species as observed at 6<sup>th</sup> October in January 2003 and significantly higher than in Al-Obour ( $F=18.1$ ,  $p<0.0001$ ). While Calliphorid and Sarcophagid flies are found in places where decaying fish are thrown and accumulated, as in Al-

Obour wholesale market. This results agree with James (1947); Shaumar *et al.* (1989) and Shaumar (1982, 1983).

It is concluded that, the high prevalence of dipterous species of medical and veterinary importance in the two markets specially Al-Obour during the period of investigation, may be accumulated, causing adverse effects on the environment and consumers. Accordingly, good hygienic knowledge is very necessary for visitors of these markets (salesmen and consumers). In addition, garbage boxes and fishes rooms must be daily cleaned.

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