SARCOSAPROPHAGOUS FLIES IN SUEZ PROVINCE, EGYPT II- SYNANTHROPIC AND ABUNDANCE DEGREES

By **REFAAT M. GABRE[1] AND EHAB M. ABOU ZIED[2]**

[1]*Department of Entomology, Faculty of Science, Cairo University.*

[2]*Department of Zoology, Faculty of Science, Faiyom Branch, Cairo University.*

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INTRODUCTION

Although it is not very easy to define what the synanthropic species is, several definitions or characteristics of synanthropic have been suggested (Peters, 1960; Povolny, 1962 and Zuska, 1983). From our point of view synanthropic species, are those which become adapted to live in close association with human environment (food and excrements) and able to transmit pathogen to him either mechanically or biologically through this intimate relationship. On the other hand asynanthropy indicates the degree of avoidance of human association (Das *et al.*, 1981).

Synanthropic indices have been calculated for blowflies in North, Central and South Finland, and also in Czechoslovakia and Hungary (Nuorteva, 1963 & 1964; Nuorteva and Laurikainen, 1964; Nuorteva and. Vesikari, 1966). The synanthropic degree at three different latitudes was studied by Das *et al.* (1981) for different blow fly species in West Bengal.

Abundance of Sarcosaprophagous flies were studied by many authors (Paul *et al.*, 1989; Tantawy *et al.*, 1996 Pararluppi *et al.*, 1996; Avancini and Silveira, 2000 and Barratt *et al.*, 2001). In a previous study, seasonal distribution and sex ratio of sarcosaprophagous flies in Suez Province were investigated (Gabre, 2002). The present study dealt with the study of synanthropic and abundance degrees of sarcosaprophagous flies in Suez Province.

MATERIAL AND METHODS

At each site of fly collection (El- Arbaeen fish market, El-Shalofa village and El-Gafra desert) four traps were used as described by Roy and Dasgupta (1975). Trapping was made according to Gabre (2002).

The degree of synanthropy of Sarcosaprophagous flies was included in synanthropic indices formulated by Nuorteva (1963). According to this formulation the synanthropic index for each species of flies was calculated as follows:

$$\text{Synanthropic index} = 2a + b - 2c / 2$$

Where, a: the percentage of fly species in dense human settlement (El-Arbaeen fish market), b: the percentage of the same fly species in sparsely inhabited place (El-Shalofa village), c: the percentage of the same fly species in uninhabited area (El-Gafra desert).

The index is calculated in relation to the total number of flies of species trapped in the three trapping localities. Highest degree of synanthropy is expressed as (+100). Lowest degree of synanthropy or asynanthropy is expressed as (-100).

Abundance (A) for the Sarcosaprophagous flies collected from the same three localities during the whole sampling period was calculated according to the formula of Facylate (1971): $A = n / N \times 100$ where,

n: total number of a definite collected fly species.

N: total number of flies collected all over the season.

RESULTS AND DISCUSSION

The results of synanthropic indices as well as the percentage of occurrence of Sarcosaprophagous flies are summarized in table (1) and illustrated in figures (1-3). It is obvious that *C. megacephala*, *M.domestica* and *L. cuprina* showed the highest degree of synanthropy (+ 90.86, + 88.43 and + 86.67), respectively. Although *C.albiceps*, *L.sericata* and *C.vicina* achieved relatively high synanthropic indices (+ 75.89, + 78.57 and +77.12, respectively), they are distributed in small numbers in the three collecting areas.

M. stabulans is a synanthropic fly (+59.18) occurring more in rural area El-Shalofa village) and absent in uninhabited locality (El-Gafra desert).Whereas, *S.aegyptiaca* and *S.argyrostoma* are asynanthropic flies although they are commonly distributed in all trapping sites with a higher preference towards the desert habitat in El-Gafra than in the two other localities.

At El-Arbaeen fish market, higher numbers of flies are caught (1938, 850, 719 and 1150) during (summer, fall, winter and spring seasons) respectively than those at El-Shalofa and El-Gafra sites. The most abundant species are *C. megacephala*, *M.domestica* and *L.cuprina* with the highest abundance degrees (Fig

1). However, *C.vicina* is abundant only in spring (2.78%) and *M. stabulans* only in winter (9.88%). Both *S.aegyptiaca* and *S.argyrostoma* are not caught during summer and winter and are abundant at the same lower ratios nearly (0.71 & 0.78%) and (0.71& 0.70%), respectively.

At El-Shalofa village and El-Gafra desert the same pattern of abundance of Sarcosaprophagous flies is repeated with some slight changes. The total numbers of trapped flies in both trapping areas are 354, 128, 96 and 386; and 80, 62, 45 and 82 during summer, fall, winter and spring seasons, respectively. Whereas the abundance of *M.stabulans* reaches its maximum value in El-Shalofa site during summer (31.64%) and spring (52.85%) and is nil in both fall and winter seasons (Fig 2).

At El-Gafra trapping site, *L.sericata*, *C.vicina* and *M.stabulans* are not caught during all collecting season. Meanwhile, the degree of abundance of both *S.aegyptiaca* and *S.argyrostoma* is high when compared with the other two sites (Fig 3).

C.megacephala, *M.domestica* and *L.cuprina* are the most abundant flies and achieve the highly synanthropic indices during the present study. Thus it is clear that the synanthropic as well as the abundance of Sarcosaprophagous flies were partly related to landscape structures. Similar observations were reported by Nuorteva (1964) who found that adult blowflies in Finland were abundant in an area where suitable breeding materials were available. Depner (1969) observed that local environment affected the trapped numbers of *Musca autumnalis*. Paraluppi (1996) reported that during his collection in street markets in Brazil *C.megacephala* was the most numerous followed by *C. putoria*, *Phaenicia eximia* and *C.albiceps*. Barratt *et al.* (2001) found that the relative abundance and seasonality of calliphorid and sarcophagid flies were affected by landscape structure. Povolny (1971), Roy and Dasgupta (1980) and Paul *et al.* (1989) stated that the species can be trapped in greater number in areas where comparatively higher human population is characterized by a highly synanthropic index.

Another noteworthy feature appeared in this study is that the adaptability of *M. stabulans* in rural areas, and *S.aegyptiaca* and *S. argyrostoma* in uninhabited area. Our finding may be explained by the fact that man creates and maintained ecological sources within his immediate environment to ensure his biological existence. In an urbanized landscape, these resources are located primarily in places where the industrial processing of agricultural products and the production of human food are concentrated. Food processing establishments thus become sites offering a rich selection of ecological niches in urban ecosystem to synanthropic animals and particularly Diptera (Zuska, 1988).

TABLE (I)

Synanthropic indices and percentage of occurrence of sarcosaprophagous flics collected from three studied areas.

Species	No. of caught flies in:				Percentage of occurrence of flies in:			Synanthropic index
	El-Arbaeen fish -market	El-Shalofa village	El-Gafra desert	Total	El-Arbaeen fish -market	El-Shalofa village	El-Gafra desert	
C. megacephala	2426	207	72	2705	89.69	7.65	2.66	+ 90.86
C. albiceps	126	29	13	168	75.00	17.26	7.74	+ 75.89
L. cuprina	811	132	32	975	83.18	13.54	3.28	+ 86.67
L. sericata	64	48	0	112	57.14	42.86	Nil	+ 78.57
C. vicina	32	27	0	59	54.24	45.76	Nil	+ 77.12
M. domestica	1098	149	37	1284	85.51	11.61	2.88	+ 88.43
M. stabulans	71	316	0	387	18.35	81.65	Nil	+59.18
S. aegyptiaca	15	27	65	107	14.00	25.23	60.75	-34.14
S. argyrostoma	14	29	50	93	15.06	31.18	53.76	-23.12

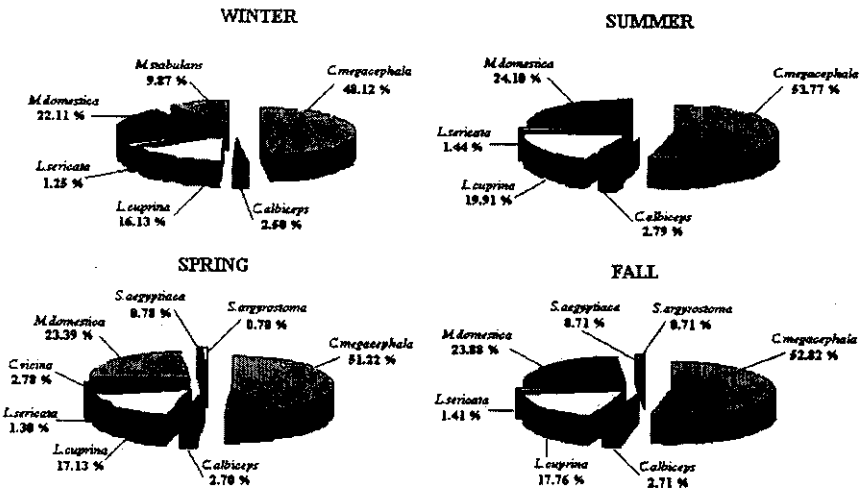

Fig. (1): Abundance of sarcosaprophagous flies in El-Arbaeen fish-market.

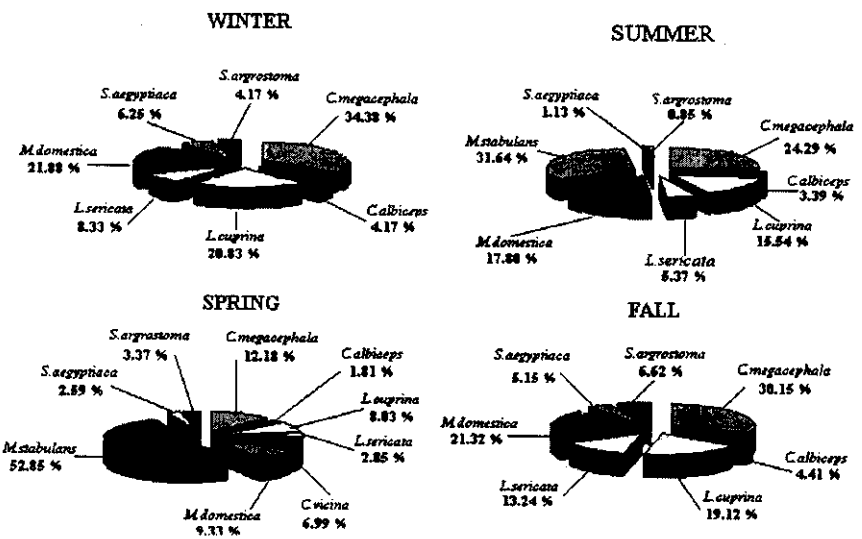

Fig. (2): Abundance of sarcosaprophagous flies in El-Shalofa village.

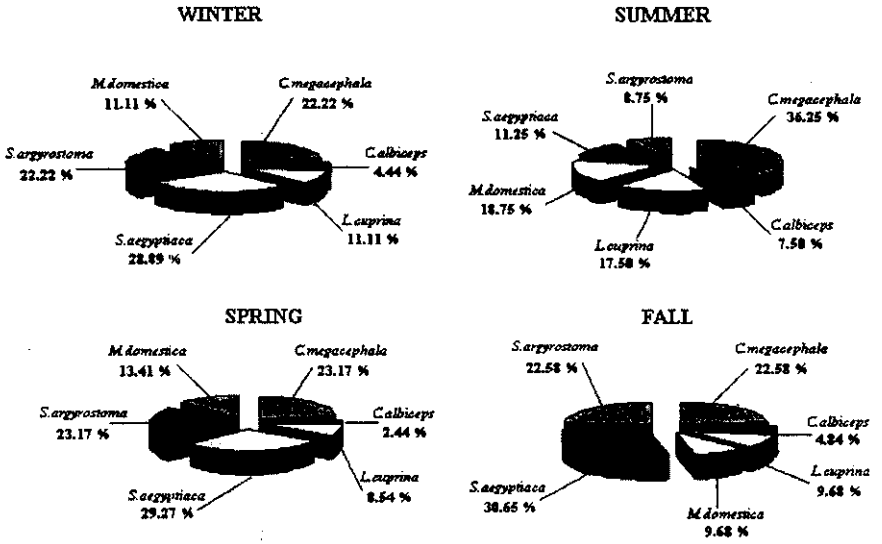

Fig. (3): Abundance of sarcosaprophagous flies in El-Gafra desert.

C. vicina has a highly synanthropic index although it was caught only during spring, in urban and rural areas. Also, *C. albiceps* and *L.sericata* achieved high synanthropic indices and no clear-cut distinction could be made between the distribution of Sarcosaprophagous flies in urban and rural areas (Paul *et al.*, 1989).

S.aegyptiaca and *S. argyrostoma* are asynanthropic flies as they both prefer the uninhabited areas in high number. The degree of synanthropy for many man-associated flies may vary considerably within the species; a closely synanthropic species in temperate areas may be totally associated with man, or almost so, in the tropics and subtropics, and even within temperate regions they may have strains with a lower degree of synanthropy (Harwood & James, 1979).

It is concluded that *C.megacephala*, *M.domestica* and *L. cuprina* achieve the highest synanthropic and abundance indices in Suez Province.

SUMMARY

Synanthropic and abundance indices for several species of Sarcosaprophagous flies trapped in El-Arbaeen fish-market, El-Shalofa (village) and El-Gafra (desert) were calculated. Results obtained showed that *Chrysomya*

megacephala (Fabricius) is the most dominant Sarcosaprophagous fly and exhibits the highest degree of synanthropy and abundance in the three studied areas, followed by *Musca domestica* (Linnaeus) and *Lucilia cuprina* (Wiedemann). Meanwhile *Sarcophaga aegyptiaca* Salem and *Sarcophaga argyrostoma* Robineau-Disvoidy are asynanthropic species.

REFERENCES

AVANCINI, R.M.P. and G.A.R. SILVERIA (2000): Age structure and abundance in populations of muscoid flies from a poultry facility in southeast Brazil. (*Mem Inst Oswaldo Cruz, Rio de Janeiro, 59 (2): 259-264*).

BARRATT, B.I.P., C.M. FERGUSON, A.C.G. HEATH and R.A.S. LOGAN (2001): Relative abundance and seasonality of Calliphoridae and Sarcophagidae (Diptera), potential vectors of rabbit haemorragic disease virus (RHDV) in the South Island of New Zealand. (*New Zealand J. Zool.28: 417-428*).

DAS, S.K., P. ROY and B. DASGUPTA (1981): Synanthropic indices for some blowflies in West Bengal. (*Oriental Ins. 15(4): 443-447*).

DEPNER, K.R. (1969): Distribution of the face fly, Musca autumnalis (Diptera: Calliphoridae), in Western Canada and the relation between its environment and population density. (*Can. Ent. 101: 97-100*).

FACYLATE, K.K. (1971): Field studies of soil invertebrates.(*2nd edition, Vishia Shkoola press, Moscow, USSr: 424pp*).

GABRE, R.M. (2002): Sarcosaprophagous flies in Suez Province, Egypt.I-Seasonal distribution and sex-ratio. (*J. Egypt. Soc. Parasitol., 32(3): 867-878*).

HARWOOD, R.F. and M.T. JAMES (1979): Entomology in human and animal health. (*Macmillan publishing Co., Inc. New York, 548 pp*).

NUORTEVA, P. (1963): Synanthropy of blowflies (Diptera: Calliphoridae) in Finland. (*Ann. Ent. Fenn. 29:1-49*).

NUORTEVA, P. (1964): differences in the ecology of Lucilia caesar (L.) and Lucilia illustris (Meig) (Diptera: Calliphoridae) in Finland. (*Wtadomosci Parazytologiczne., T.X.Nr.(4-5)583-587*).

NUORTEVA, P. and T. VESIKARI (1966): Synanthropy of blowflies (Diptera: Calliphoridae)) on the coast of Arctic Ocean. (*Ann. Med. Exp. Fenn. (44): 544-548*).

NUORTEVA, P. and E. LAURIKAINEN (1964): Synanthropy of blowflies (Diptera: Calliphoridae) on the island of Gotland, Sweden. (*Ann. Ent. Fenn. (30): 187-190*).

PARALUPPI, N.D., J.C. DE VASCONCELOS, J.S. DE AQUINO, E.G. CASTELLON and M.S.B. DE SILVA (1996): Calliphoridae (Diptera) in Manaus :IV.Bacteria isolated from blowflies collected in street markets. (*Acta Amazonica, 26(1/2): 93-96*).

PAUL, A., P. ROY and B. DASGUPTA (1989): Sarcosaprophagous flies (Diptera: Calliphoridae, Muscidae and Sarcophagidae) in the urban, rural and forest areas of Jalpaiguri district, West Bengal India. (*J. Bengal Nat. Hist. Soc., 8(2):36-53*).

PETERS, H. (1960): Űber den Begriff der synanthropie. (*Z. Angew. Zool., 47:35-42*).

POVOLNY, D. (1962); Vesuch einer Klärung des Begrffes der synanthropie von Tieren. (*Folia Zool. (Brno),N.S. 11:105-112*).

POVOLNY, D. (1971): Synanthropy. (*In: Flies and disease. Volume I by Greenberg, B., Princeton University, press, Princeton, New Jersey*).

ROY, P. and B. DASGUPTA (1975): Seasonal occurrence of Muscid, Calliphorid and Sarcophagid flies in Siliguri, West Bengal, with a note on the identity of *Musca domestica* L. (*Oriental Ins. 9:351-374*).

ROY, P. and B. DASGUPTA (1980): Synanthropy of flies (Diptera: Muscidae, Anthomyiidae, Calliphoridae, Sarcophagidae) in Siliguri, Darjeeling, India. (*Proc.Zool. Soc., Calcutta.(31):69-74*).

TANTAWI, T., E.M. EL-KADY, B. GREENBERG, and H.A. El-GHAFFAR (1996): Arthropod succession on exposed rabbit carrion in Alexandria, (*Egypt. J. Med., Entomol., 33(4):566-580*).

ZUSKA, J. (1983): Synanthropic insect pests and their management in the food-processing industry. (*In: Urban Entomology: Interdisciplinary Perspectives. G.W. Frankie and C. S. Koehler (EDS). Praeger, New York, pp, 301-331*).

ZUSKA, J. (1988): Food-processing establishments as a major ecological opportunity for synanthropic flies. (*J. Olejniček (edit.). 245-252*).