INTRODUCTION

Phlebotomine sand flies (Diptera: Psychodidae) are vectors of leishmaniases (Kinetoplastida: Trypanosomatidae) a parasitic diseases with a wide range of clinical symptoms and manifestations: cutaneous, mucocutaneous and visceral leishmaniasis. Cutaneous leishmaniasis (CL) is zoonosis affecting people in more 88 countries around the world, with 1-1.5 million new cases of cutaneous leishmaniasis reported annually **(Desjeux, 2001)**. Sand flies also carry and transmit other pathogens such as bartonellosis **(Birtles, 2001)**, phleboviruses **(Tesh, 1988)** and certain flaviviruses and vesiculoviruses **(Ashford, 2001)** causing health problems for human and domestic animals.

In Egypt cutaneous leishmaniasis due to *Leishmania major* is endemic in Sinai **(Mansour *et al*., 1984 and Frayauff *et al*., 1993)** and in the Nile Delta **(Morsy *et al*., 1995)**. The vector of cutaneous leishmaniasis is *Phlebotomus papatasi* **(Wahba *et al*., 1990)** and *Meriones sacramenti*, *M. crassus*, *Psammomys obesus*, *Gerbillus pyramidum* and *Rattus rattus* are the main reservoir hosts **(Morsy *et al*., 1982 and El-Hossary *et al*., 2000)**.

Like many other diseases CL has a natural "habitat" and hence its distribution and incidence are greatly influenced by environmental factors affecting the population of the vectors, reservoirs and human hosts. Although the notion has long been realized and despite the expansion of information on effect of

environmental factors on sand fly vectors of leishmaniasis, little attempt has been made to study the effect of specific environmental factors on sand fly populations. Such study would allow managers of control programs to define the problem and use intervention nationally, where it is most likely to succeed.

It is not clear which environmental factors have the greatest effect on the distribution of sand fly species. Temperature may be the most important factor and known to affect the survival and speed of development of the different stages in the life cycles **(Elnaiem *et al*., 1998)**. In the temperate regions of the Old World, adult phlebotomine sand flies are found only during the summer months with population of certain species peaking in late spring **(Dinesh *et al*., 2001** and **Wasserberg *et al*., 2003)**. Whereas others species tend to peak later in summer **(Morillas-Marquez *et al*., 1983)**.

The study of the seasonal variation in populations of phlebotomine sand flies in particular areas is very important to understand their biology and possible epidemiological importance, and even in the absence of a precise data on man biting activity at a certain area, the seasonal fluctuation in the female numbers could give indication of its activity. These also provide data on the risk of transmission of parasites to man. The vertical distribution of phlebotomine sand flies above ground level could be one of the factors that help to define their hosts and the transmission cycle of parasite as shown by **Williams, 1970** and **Brinson *et al*., 1992.** Moreover, its is perhaps based on this information that instructions

could be issued to spray insecticides for the control of adult sand flies as in the case of *P. argentipes* in India (**Hati *et al*., 1991).**

Adult phlebotomine sand flies typically exhibit nocturnal and crepuscular activity **(El Said *et al*., 1986** and **Young and Duncan, 1994).** Although their movements around a host consist of short jumps, they are able to travel distances of at least 200 m in a single night **(Chaniotis *et al*., 1974** and **Alexander, 1987)**.

The lunar cycle influences the adult flight behavior of many insects, particularly those with at least, aquatic phase of development, principally affecting reproductive behavior such as the initiation or regulation of mating swarms **(Neumann, 1995)**. The effect of lunar phases on the behavior of certain Diptera, particularly Culicidae has been demonstrated. **Janousek and Olson, (1994)** found that the attractiveness of light traps increased during a lunar eclipse and diminished under a Full moon.

Few studies have demonstrated an influence of the phases of the moon on phlebotomine sand fly behavior **(Souza *et al*., 2002)**. Based on existing knowledge of the biology of sand flies, it might be expected that these insects is affected by the lunar cycle. This also was one of the factors investigated in the present study in two villages of the Nile Delta Governorates namely; Kafr Tahla (Qalyubiya) and El-Quantara El- Beida (Kafr El- Sheikh).