SUMMARY

Sand fly species composition and its distribution in association to the environmental factors were studied in two villages representing two of the Nile Delta Governorates namely; Kafr Tahla, (Qalyubiya) and El-Quantara El-Beida, (Kafr El-Sheikh). The study period extended through two successive years from September 2003 to August 2005. Sand flies collection was made by sticky paper traps, which were set in three sites in domestic habitat namely; human dwellings, animal pens and rodent burrows. The study covered the following aspects.

1. Sand fly species composition.

A total of 14176 sand flies were collected from the two villages using sticky paper traps set up both outdoors and indoors. The obtained results indicated that the number of collected sand flies was higher in Kafr Tahla than in El-Quantara El-Beida where a total of 9587 and 4589 sand flies was collected in from the two villages respectively. The density of sand flies was higher indoors than outdoors especially in Kafr Tahla. Only one sand fly species was encountered from both villages namely, *Phlebotomus papatasi*.

2. Monthly abundance of *Phlebotomus papatasi* in relation to prevailed weather conditions.

Sand flies monthly abundance was studied in both villages during the study period (September 2003 to August 2005).

Kafr Tahla village.

The obtained results indicated that *P. papatasi* started its activity from April to end of December outdoors and from April to November indoors. No flies could be collected in cold months. There were two peaks of abundance outdoors; the first peak was in June (4.55 fly/ trap) and the second peak was in September (10.60 fly/ trap). *Phlebotomus papatasi* recorded two peaks of abundance indoors; one in June (19.42 fly/ trap) and the second in October (43.58 fly/ trap).

El-Quantara El-Beida village.

The obtained results indicated that *P. papatasi* started its activity from April to end of January outdoors and from May to November indoors. No flies could be collected in cold months. There were two peaks of abundance outdoors; the first peak was in June (3.20 fly/ trap) and the second peak was in October (2.86 fly/ trap). *Phlebotomus papatasi* recorded two peaks of abundance indoors; one in June (11.50 fly/ trap) and the second in September (10.00 fly/ trap).

Phlebotomus papatasi abundance was positively correlated to weather conditions, particularly the temperature in Kafr Tahla and El-Quantara El-Beida (r^2 = 0.6197 and r^2 = 0.6695 respectively). No correlation was found between *P. papatasi* densities and RH% (r^2 =

0.0261 and 0.0168 respectively) and wind speed (r^2 = 0.0099 and 0.0059 respectively).

3. *Phlebotomus papatasi* sex ratio.

The number of collected males outnumbered females outdoors in Kafr Tahla and El-Quantara El-Beida, where the mean sex ratio (Male: Total) was 0.70 ± 0.10 and 0.72 ± 0.11 respectively which was significantly higher than the mean sex ratio indoors (0.56 ± 0.10 and 0.58 ± 0.06 respectively). This ratio was in favor of males especially if collections were performed outdoors.

4. Density of *Phlebotomus papatasi* collected by sticky paper traps at animal pens and rodent burrows.

The relation between sand fly densities and animal hosts was studied to help understand their hosts preference. The obtained results indicated that *P. papatasi* densities collected at animal pens in Kafr Tahla and El-Quantara El-Beida (1.083 ± 1.14 and 1.125 ± 1.13 respectively) were higher than *P. papatasi* densities at rodent burrows (0.247 ± 0.24 and 0.089 ± 0.08 respectively).

5. Vertical distribution of *Phlebotomus papatasi* collected by sticky paper traps.

Sand flies were collected at three different heights above ground level (0.15 m., 2.0 m. and 4.0 m.) in Kafr Tahla village.

Phlebotomus papatasi was more abundant at 4.0 m. above the ground level, where the mean number of *P. papatasi* collected reached 42.5 ± 17.74. Whereas, the mean number of flies collected at 0.15 and 2.0 m. above the ground level were more or less the same (36.9 ± 16.18 and 34.5 ± 14.42 respectively). Statistical analysis of the data revealed that the numbers of flies collected at three different heights above the ground level did not appear to significantly differ.

6. The effect of lunar cycle and its phases on sand fly abundance.

Phlebotomus papatasi sand fly was collected outdoors using sticky paper traps for 192 nights during lunar cycle; Crescent, Full moon, 3/4 moon and New moon. Spearman's correlation showed positive relation between *P. papatasi* activity and the fraction illumination of moon. However, the lunar cycle had no direct influence on *P. papatasi* activity during the different moon phases as revealed by the Kruskal-Wallis test.

Kafr Tahla village.

Phlebotomus papatasi activity reached maximum during the Full moon where the mean number of flies collected was 111.50 ± 75.23 followed by Crescent and 3/4 moon (83.77 ± 72.59 and 81.10 ± 55.58 respectively). The minimum number of *P. papatasi* flies was collected during the New moon (59.55 ± 49.16).

El-Quantara El-Beida village.

Phlebotomus papatasi activity reached maximum during the Full moon where the mean number was 59.17 ± 37.14 followed by 3/4 moon and Crescent (49.66 ± 33.61 and 41.64 ± 27.94 respectively). The minimum number of *P. papatasi* flies was collected during the New moon (37.44 ± 25.52).

7. Species composition and relative abundance of rodent species.

Four rodent species were collected from the two villages and the taxonomic classification indicated the presence of *Rattus norvegicus*, *R. rattus alexandrinus, R rattus frugivorous,* and *Mus musculus*. Results indicated that *R. norvegicus* recorded the highest abundance in Kafr Tahla and El-Quantara El-Beida villages (42% and 36% respectively) followed by *R. rattus alexandrinus* (33% and 30% respectively), *R rattus frugivorous* (17% and 26% respectively) while *Mus musculus* recorded the lowest distribution (8% and 8% respectively). The obtained results indicated that relative abundance of rodents reached maximum in the hot season.