ECOLOGICAL STUDIES ON BILHARZIUS SP. IN ISMAILIA GOVERNORATE

A thesis Submitted for the Partial Fulfilment

of Master Degree (Parasitology)

By

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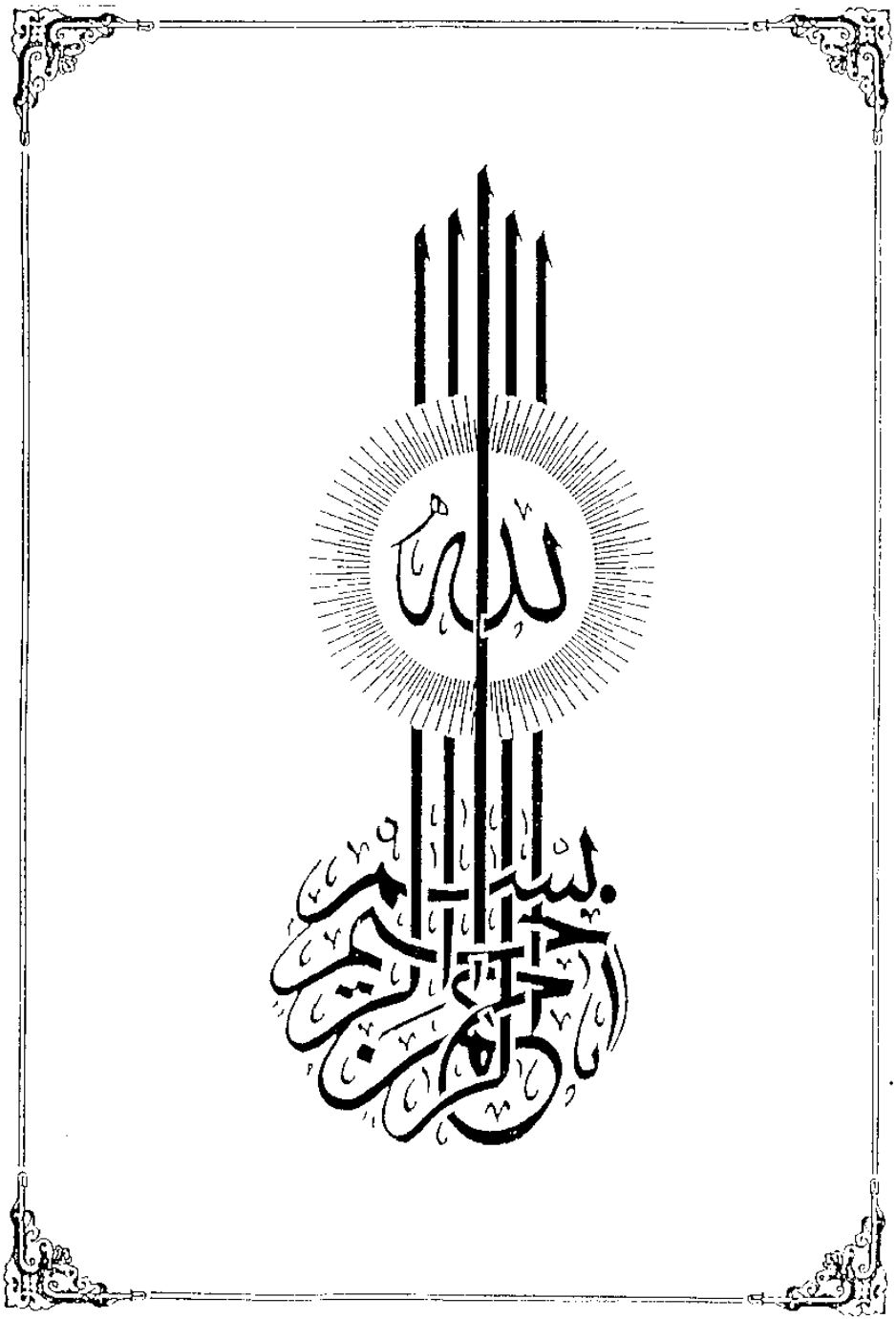
C O N T E N T S



A C K N O W L E D G E M E N T

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I N T R O D U C T I O N

The phlebatominae flies or sandflies belong to the family psychodidae. They occur throughout the tropics and subtropics and are found in some temperate areas of Europe, Central Asia and North America, as well as the Middle East.

The phlebatomine sandflies of which there are about 600 known species, are small (1.5 - 2.5 mm.), hairy flies with long slender legs. The lanceolate wings, also very hairy, are held in a vertical V over the back of the resting fly. The antennae are filamentous and similar in both sexes.

The female sandfly feeds on blood, one or more meals are needed to complete the maturation of each batch of eggs . Both sexes probably feed on the juices or secretions of plants but male flies do not suck blood. The biting mouth-parts are, however, similar in both sexes and consists of a pair each of toothed mandibles and maxillae, with a median labium and hypopharynx. The labrum is short and forms part of the head.

The mouth parts are flanked on each side by hairy maxillary palps.

Phlebotomine sandflies are the vectors of visceral leishmaniasis (kala-azar), the various forms of cutaneous leishmaniasis (Oriental sore, espondia etc.) bartonellosis (oroya fever, Carrion's disease) and sandfly fever (papataci fever, three-day fever).

The distribution of the group is mainly tropical and subtropical but extends into north temperate latitudes to the Channel Isles and southern Canada. Southern limits are less well known but sandflies occur in southern parts of Australia and in South America to about 40°S. The vertical distribution of sandflies extends to 2800 m. or more (Peru, Ethiopia) in warm parts of the world.

Sandflies are mainly crepuscular and most species are inactive in daylight hours and seek shelter in dark, moist places. Typical daytime resting places include dark corners and crevices of houses and out-buildings, in pit latrines. Crevices in stone walls, tree-holes, soil and rock crevices caves, animal burrows and, where suitable termitaria are found, the ventilation shafts of termite hills (e.g. East, West and South - West Africa, Philippines, Australia)

Literature Review:

I- Taxonomic position of the family psychodidae is classified into two subfamilies:

a) Psychodidae, members of this subfamily are characterized by the second longitudinal vein which gives off its first branch in the root of the wing. The female has a horny ovipositor, while the male has two claspers. e.g. genera Pericoma and Psychoda and their allies.

b) Phlebotominae, Members of this subfamily are characterized by being blood - sucking flies and responsible for transmissions of some protozoal (as Leishmaniasis) and viral diseases (as sand fly fever). The 2 genera belonging to this subfamily may be distinguished by (i) two simple veins between the forks of the second and fourth longitudinal: genus **Phlebotomus** (ii) one simple vein between the forks of the second and fourth longitudinal veins. Seventh longitudinal vein very short: genus Sycorax

The genus Phlebotomus work Phlebotomus means the "vein cutter". There are about 600 known species of sand-files nowadays, sandflies of the old world belong to the genera Phlebotomus and Sergentomyia, those of the new world are included in the genra Lutzomyia, Brumptomyia Warilaya and Hertigia.

11- Phlebotomus Rodani, 1940:

The following review of Phlebotomus "sandflies" is concerned mainly with the species occurring in the old world. Murry (1888) gave Phlebotomus the common name "sand flies". Newstead (1911), divided the sandflies into two group (1) those with hairs on the dorsum of the abdomen erect (11) those with hairs recumbent, Franca (1919), divided the genus Phlebotomus into two subgenera according to the characters of male termenalia. Again Franca and Parrot (1921) divided genus Phlebotomus into five subgenera Adelr and Theodor (1926), from examination of

Palestine sandflies found that some species have the posterior portion of the buccal cavity with a number of teeth and a pigmented area of chitin which are absent in other species. Sinton (1927), found that species with erect hairs having spermathecae with segmented appearance while in species with recumbent hairs there are smooth outline spermathecae so the genus was divided into three main division (subgenus) i- erect-haired division, ii- recumbent-haired division and iii-- intermediate division. Nitzulescu (1931) and Theodor (1931), considered the buccal cavity to be of greater diagnostic value and divided the genus into two primary divisions (i) species with buccal armature and (ii) species without buccal armature. Theodor (1948), recognized two genera in the old world, Phlebotomus and Sergentomyia, the genus Phlebotomus is divided into nine subgenera on the characters of pharynx, spermtheca and male terminalia, the genus Sergentomyia is divided into three subgenera.

Hertig (1948), described a blood sucking fly close to *Phlebotomus* but it's venation was nearer to *Bruchomyia* and *Nemoplpus*. Parrot (1948) identified nine species of *Phlebotmus* from Khartoum. Kirk and Lewis (1952) in Etheopia described three new species of *Phlebotomus*. Parrot (1951), analysed in detail the different veins expressed during the development in an attempt to reach a satisfactory natural classification. Kirk and Lewis (1953) detailing with Ethiopian Sandflies, concluded that the true *P; africans* Newstead and *P. squamipleuris*, Newstead are identical and that the latter name should be used for these species. Fairchild (1955) in the old world proposed classifcation similar to that of Theodor (1948), but including only three subfamilies the Phlebotominae being divided into two tribes the phlebomini and Bruchomuni originally such groupings were passed

on appearently simple fixed characters of the old world species on abdominal hairs, male genetalia with or without spines on the the latera lobes, also ala index, variation in the length of palpal segments. Qutubudin (1962) in Sudan, described two new species of sandflies, S. sattu and S. squamipleuris. Lewis (1967) classified sandflies depending upon the characters of the pharynx, spermatheca and male terminalia. Zein El Din (1972), in Egypt as a result of a survey of phlebotomids was made in Baharia, Kharga, and Dakhla Oasis, only one P. papatasi was found in Dakhla Oasis, Gaibov, in (1974) U. S. S. R. identified seventeen species of phlebotomines from Uzbekistan, 17 of which belong to genus Sergentomyia. Abonnenc and Clasterier (1974) in Guinea, found twenty three species of phlebotomines, all species were of genus Sergentomyia. Ashford (1974) in Ethiopia,

identified 39 species of phlebotomine sandflies, Brygoo (1974) in Madagascar, identified two species, Sergentomyia squamipleuris and S. madagas cariensis.

Javadian (1975), identified 24 species of Phlebotomus from Iran. Rioux (1975), concluded that the systematic value of cibarial aramature in the genus Sergentomyia is discussed but subspecies could not be differentiated by number of teeth, moreover, in Spain the number of teeth increases with progr-ession southwards. Hussien (1976), found that the occurrence of P. papatasi and S. antennata reported for the first time in Kuwait in (1974). Phlebotomine distribution along the coast of Arabian Gulf with peaks of aboundance in may, in P. papatasi the ratio of femaleto male averaged 6 : 4. White

(1976), stated that polyrene chromosomes from larval salivary gland, also on other tissue of larvae, pupa and adult flies, thin chromosomes unsuitables for detailed study, the salivary chromosomes arms pattering was sufficiently well differentiate to be cytotoxonomically useful. Bhat (1976), concluded that chromosomes preparation were made from fully grown four instar larvae of Phlebotomus papatasi after colchicine treatment, staining of head in lactoaceto-orecin stain and squashing in acetic acid, the karyotype of P. papatasi consists of 4 pairs of chromosomes (2 n= 8), the chromosomes are numbered from I to V according to the system followed for mosquitoes, I being the shortest and IV the longest, chromosome I is acrocentric, II and III are sub-

metacentric and IV is metacentric, no sexual dimorphism was observed, Morsy and Shoura (1976), in Saudi Arabia, reported 3 species of sandflies P. papatasi, Paraphlebotomus caucasicus and Sergentomyia squamipleuris.

Madim (1977) suggested that P. sergenti could be another probable vector of cutaneous Leishmaniasis. Zaher (1980) reviewed the different species of Phlebotomus and Sergentomyia in the Middle East in both East Mediterranean and north - Mediterranean;

III - Egyptian Sandflies:

Phlebotomus papatasii was first recorded by Wilococks (1917). Other species as Phlebotomus minutus was collected by Eflatoon (1922) from the northern area of Cairo Governorate. Paraphlebotomus squamipleusis (=Sergentomyia squamipleusis) was reported by El Halawani in Sharkyia Governorate as indicated by Khalil Bey (1934). Phlebotomus sergenti was found also in Cairo by Theodor (1948). Hassan (1968) found Sergentomyia teberiadis in Luxor and Aswan , Zein El Din (1972) recorded S. palestinensis from both El Bahariya and El Dakhla Oasis. Recently , El Sawaf et al, (1984) described Phlebotomus langeroni in the Western areas of Alexandria Governorate in the same year, Gad and Saeid