

Seasonal activity of sand flies (Diptera Psychodidae) in Khorramabad County, Lorestan Province, IranMohammad Hassan Kayedi¹, Nargess Abdali², Reza Rostami³¹Razi Herbal Medicines Research Center and Department of Parasitology and Mycology, School of Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran.²Student Research Committee, Lorestan University of Medical Sciences, Khorramabad, Iran³Razi Herbal Medicines Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran.Kayedi78@yahoo.co.uk

Abstract: Background: Ecological study of sandflies with emphasize on fauna, habitats and seasonal distribution are very important to determine different tools in campaign against cutaneous Leishmaniasis. Until now, ecological study of sandflies have not been carried out in the study area, so the findings of the present study can introduce tools to campaign against the disease. **Materials and methods:** Sticky traps were used to collect sand flies from 6 villages of Khorramabad district in west of Iran from May to November 2010. Each month 120 sticky traps were used to collect sand flies from human and animal dwellings, outdoor shelters (mountain), Rodent nests, outdoor walls and warehouses. All collected specimens were kept in 70% ethanol and were sent to Medical Entomology Department, Tehran University of Medical Sciences for species identification. **Results:** In total 3692 sandflies (1861 female, 1831 male) were captured that 1729 were identified as *Phlebotomus* (1013 male and 716 female) and 1936 were identified as *Sergentomyia* (818 male and 1145 female). *P. Papatasi* and *S. dentata* were the dominant species from *phlebotomus* genus (68.3%) and *Sergentomyia* genus (93.2%) in the area. The minimum and maximum prevalence of sandflies in order belonged to May and August during the field studies. The most species diversity in two genus were belonged to mountain and outdoor walls. The most prevalence of *phlebotomus* Genus were caught from human dwellings. **Conclusion:** The results of the present study showed that fauna of sandflies in the study area approximately is similar to the other parts of the country and the seasonal and monthly activities of sandflies are dependent to climate in the area.

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Keywords: Sandflies, ecology, Psychodidae, *Phlebotomus*, *Sergentomyia*, Khorramabad.

1. Introduction

Sand flies are usually found in the tropical regions of the world, e.g (south Europe, Asia, Africa, Australia, central and southern America), but don't exist in New Zealand and the pacific islands (1,2). Their habitats have been observed in areas below sea level to the 3300 meter heights of Afghanistan (2,3).

Sand flies are small insects rarely with a length greater than 3 millimeters, have a body full of hair and unlike Culicidae mosquitoes their approach to the host is without sound. Their flights are short and in a spring like manner with a short flight radius that rarely exceeds one kilometer (2). Their activity is at nights, although a small number of species feed during the day. Their shelters during the day are usually cool and moist and consist of human dwellings, latrines, cellars, animal dwellings, caves, fissures, cliffs, holes in the soil, dense vegetation, holes in trees, nests of rodents and other mammals, birds and termite's nests (2,4,5,6).

The aims of the study was to evaluate and indicate the seasonal activity of sand flies in the region due to sand flies are the vectors of Cutaneous and Visceral Leishmaniasis in the area and

understanding of their seasonal activity help to the policy makers to design better vector control programs.

2. Material and Methods

The study was carried out in the six villages of Khorramabad County for collecting the sand flies. The sand flies in rural areas were collected from the human dwellings, animal dwellings, outdoor walls, warehouses, and in the surrounding areas of the villages from the caves holes and cracks in the mountainous areas and Rodent nests.

The collecting of sand flies was done monthly in a way that each month from May to November the research team would visit the places of interest and catch and collect the sand flies. The methods were as follows: first the front and back of 120 A4 papers were soaked in castor oil, then the papers were punched to long pieces of wood (each A4 paper to one stick), then were placed into boxes and carried to the collecting areas (one village per assignment).

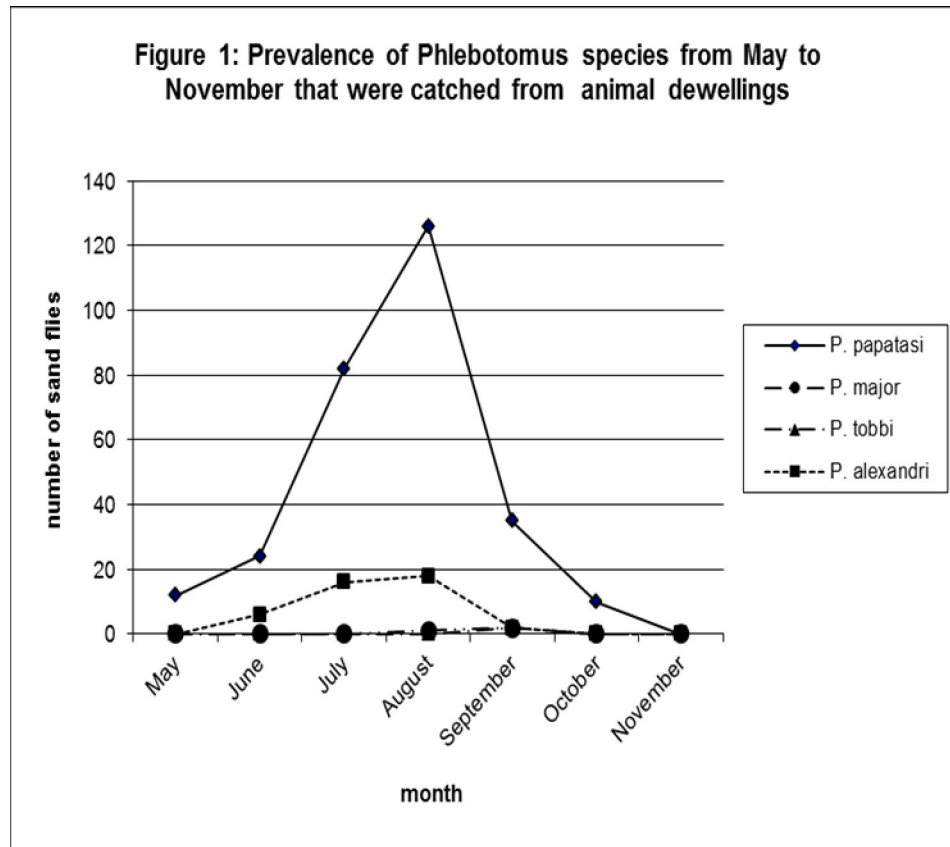
20 sticky traps were used for collecting of sand flies in each collecting site, in human and animal

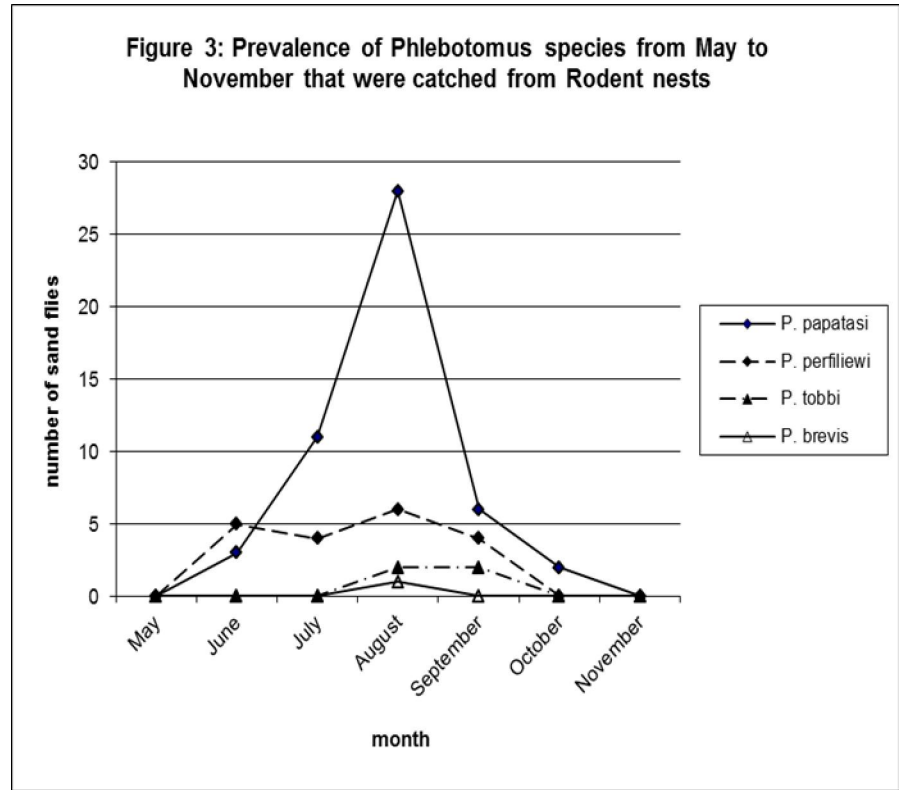
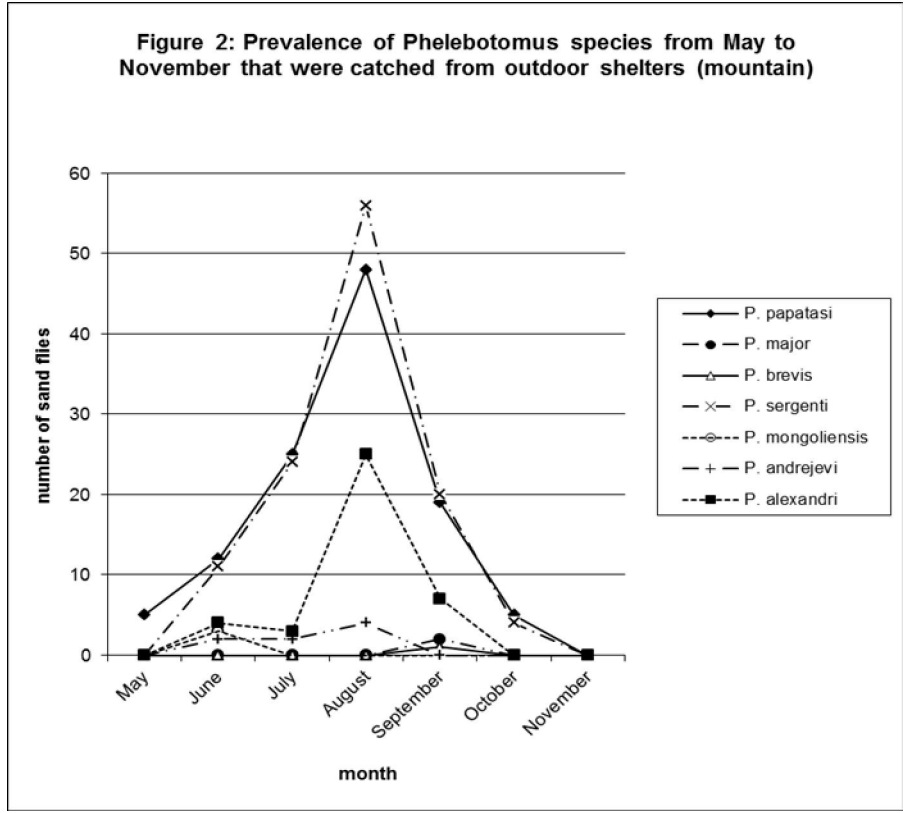
dwellings, warehouses, outdoor walls, Rodent nests and mountains. sticky traps were put in their indicated sites from sunset and were collected after sunrise the next day, so sand flies that came out during night trapped in sticky traps. Research team collected sticky traps next day and transferred them to Razi Herbal Medicines Research Center for maintenance, separation of sand flies from the A4 paper and degreasing and were put in glass containers containing 70% ethanol and then were sent to the Medical Entomology Department of, School of Public Health, Tehran University of Medical Sciences to identify the species.

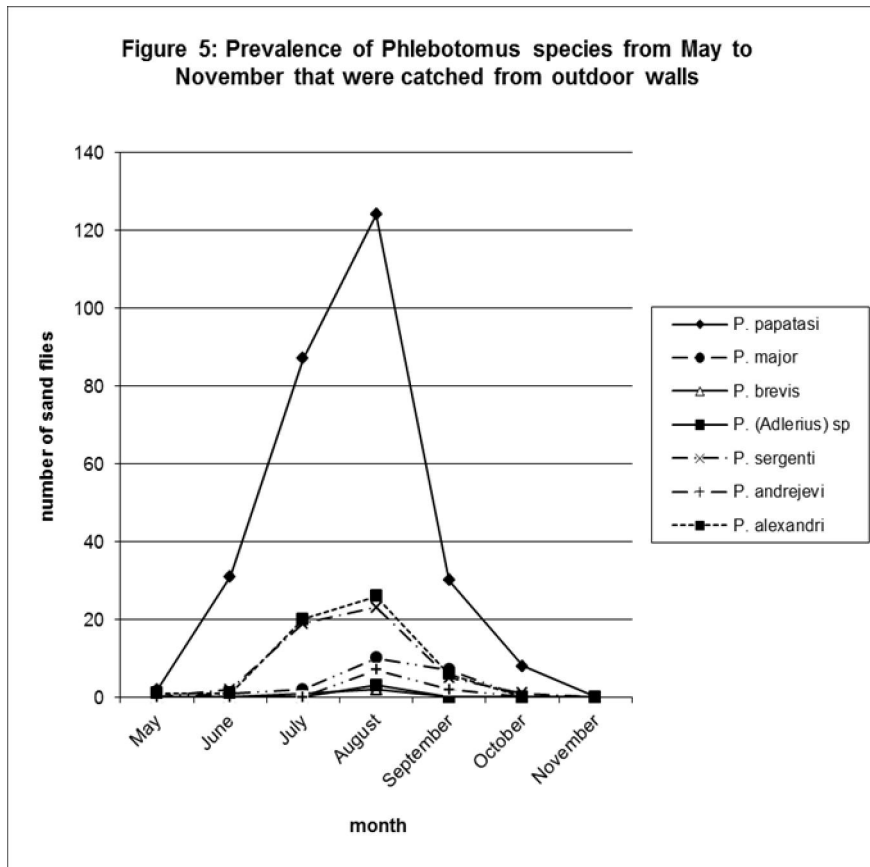
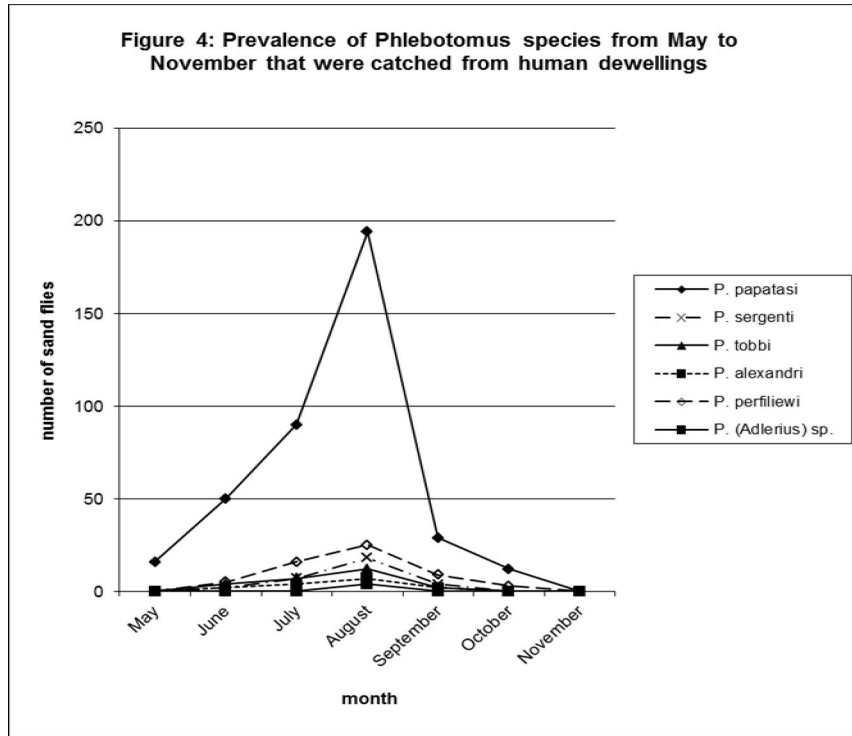
3. Results

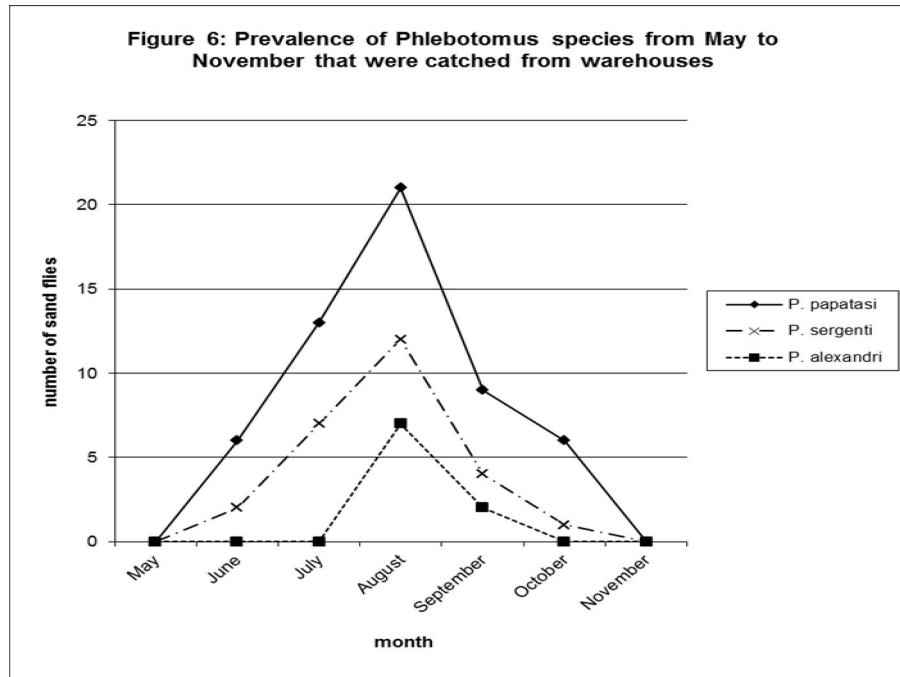
In total 3692 sand flies were collected that different species of *Phlebotomus* and *Sergentomyia* Genus were identified by entomological keys.

Figures 1 to 6 in order show the prevalence and different species diversity of the *Phlebotomus* Genus from 6 capturing locations: animal dwellings (Figure 1), mountains (Figure 2), Rodent nests (Figure 3), human dwellings (Figure 4), outdoor walls (Figure 5) and warehouses (Figure 6) in the different seasons and months of the year. As can be seen in the graphs the least abundance of sand flies captured in all capturing locations was from May (average temperature of 18.6°C) and November (average temperature 15.1°C) and the maximum abundance was in August (hottest month of the year-average temperature of 30.8°C). Therefore from May to August we can see an increase in sand flies abundance and conversely the abundance reduces as we move on from August to the colder months of the year. The above model is in connection with the activities of almost all of the sand flies species caught and shows that it is a function of the heat in different months of the year.









4. Discussions

In a study carried out by Srinivasan et al. in connection to the seasonal activity of *P. papatasi* in India, a significant and positive relationship between rainfall and humidity with the abundance of sand flies in the region was found (7).

In the study carried out by Basimike and Mutinga in Kenya, the abundance of different species of *Phlebotomus* and *Sergentomyia* during the dry season in animal holes and termite nests showed an increase. The mentioned places are the most important places for resting and reproduction of sand flies. Tree's holes and human dwellings were the most important places for the sand flies resting during the moist seasons. The *Phlebotomus* sand flies were mostly captured from termite nests, human dwellings and animal holes (8).

In the study carried out by Yaghoobi-Ershadi et al. on Zoonotic Cutaneous Leishmaniasis in a village in northern Natanz in central Iran, *p. papatasi* was contaminated with *Leishmania major*. This study showed that *P. papatasi* is the vector of Zoonotic Cutaneous Leishmaniasis in this part of Iran (9).

In the study carried out by Mansour and Reza about the seasonal activity and rest areas of the sand flies in north east Shiraz in southern Iran, 2500 sand flies were caught using sticky traps. 4 species of sand flies called *S. dentata*, *S. sintoni*, *P. sergenti*, *P. papatasi* were identified. The maximum activity and abundance of 2 species of *P. papatasi* and *P. sergenti* was in September and the minimum was in December.

In all of the months studied the sand flies abundance was much higher at outdoors compared to indoors except for June and May (10).

Ok et al. introduced *P. syriacus*, *P. major*, *P. sergenti* and *P. papatasi* to be the probable vectors of Cutaneous Leishmaniasis and Visceral Leishmaniasis and *P. sergenti* the probable vector for *Leishmania tropica* in Turkey (11).

Other researchers have worked on ecology, habitats, and seasonal activity of sand flies (12-16).

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