

NOTE ON THE DISTRIBUTION OF *PHLEBOTOMINE* SAND FLIES IN SOUTHERN ALBANIA

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Zoonotic visceral leishmaniasis (VL) is a re-emerging disease in the Mediterranean area. We report one entomological investigation (May–October 2006) aimed to study the current species composition and seasonality of *Phlebotomine sand flies* in 10 districts of Albania. Standard blacklight traps (8W UV light manufactured in Onderstepoort, South Africa) employed for sampling *Culicoides* midges in the frame of bluetongue disease surveillance were used for the first time in Albania in *Phlebotomine* monitoring. A total of 1660 sand flies were collected and five species were identified, *Phlebotomus tobbi*, *Phlebotomus neglectus*, *Phlebotomus perfiliewi*, *Sergentomyia minuta* and *Sergentomyia dentate*. Among the species, which may act as *Leishmania infantum* vectors, *P. tobbi* and *P. neglectus* were the most abundant.

Key words: *Phlebotomine sand fly*; *Leishmania infantum*; *Phlebotomus tobbi*; *Phlebotomus neglectus*; Albania

БЕЛЕШКА ЗА РАСПРОСТРАНЕТОСТА НА ПЕСОЧНИТЕ МУВИ *PHLEBOTOMINE* ВО ЈУЖНА АЛБАНИЈА

Zoonotic visceral leishmaniasis (VL) е болест која повторно се појавува во средоземноморската област. Наведуваме едно ентомолошко истражување (мај–октомври 2006) чија цел беше во 10 области од Албанија да се проучат актуелните видови и времето на појавување на песочните муви *Phlebotomine*. Стандардните мамки со црно светло (8W UV светилки произведени во Onderstepoort, Јужна Африка) кои служеле за фаќање на мушички *Culicoides* во рамките на набљудувањата на болеста син јазик, во Албанија за прв пат беа употребени при набљудувањето на *Phlebotomine*. Од вкупно 1660 песочни муви беа собрани и идентификувани 5 вида: *Phlebotomus tobbi*, *Phlebotomus neglectus*, *Phlebotomus perfiliewi*, *Sergentomyia minuta* и *Sergentomyia dentate*. Помеѓу овие видови, кои можат да се јават како вектори *Leishmania infantum*, најчести се *P. tobbi* и *P. neglectus*.

Клучни зборови: песочни муви *Phlebotomine*; *Leishmania infantum*; *Phlebotomus tobbi*; *Phlebotomus neglectus*; Албанија

1. INTRODUCTION

Zoonotic visceral leishmaniasis (VL) is a re-emerging disease in the Mediterranean area. The geographical distribution of cases and the risk factors underlying disease occurrence and spreading are not systematically monitored and documented in Albania. *Phlebotomine sand flies* (Diptera: Psychodidae) are responsible for the transmission of *Leishmania infantum*, the protozoan agent of human and canine leishmaniasis in the Mediterranean

area. In this note, we report an entomological investigation carried out in 2006 aimed to study the current species composition and seasonality of *phlebotomine sand flies* in 10 districts of Albania.

Results from a retrospective analysis of VL cases, reported 867 parasitologically confirmed VL cases recorded in 35 of 36 Albanian districts with an average of 173 cases/year and a cumulative morbidity of 2.8/10000 population. The temporal distribution of cases showed an increasing

trend (from 144 to 209), indicating that cases have almost doubled during the past 10 years. A high proportion of the patients (67.6%) were children aged < 5 years. The entomological survey confirmed *Phlebotomus tobbi* and *Phlebotomus neglectus* as the probable vectors, being the most abundant and widespread species (Adhami & Murati, 2000; Velo et al., 2003).

Previous results carried out at the Institute of Veterinary Research (now Institute of Food Safety and Veterinary) in Tirana, showed that 23 out of 177 dogs examined (12,9%) were positive for leishmaniasis. As a result of an uncontrolled, dramatic increase of the number of stray and owned dogs, leishmaniasis has recently been observed in districts which have been free from the disease (Kero & Xinxo, 1998; Cicko et al, 1999).

2. MATERIAL AND METHODS

Study area

The sand flies collected in this study were part of an entomological sampling programme for *Culicoides* midges, carried out in southern Albania

in the frame of the bluetongue disease surveillance (Project: CARDS PROGRAME 2003, "Monitoring the Health of Small Ruminants", Ref: Europe Aid/116803/C/SV/AL).

Entomological monitoring was carried out in the three southernmost regions of Korca, Vlora and Gjirokastra. The three regions comprise 10 districts with a total of 799 villages which are taken as the basic epidemiological unit in Albania (Fig. 1).

While a sampling frequency based on 50×50 km² is considered sufficient for a long-term monitoring of *Culicoides*, a more intensive sampling frame based on 88 km² sections was applied due to the cross-sectional nature of the study and the wide range of habitats present over a small geographical territory in Albania. Using Arcview9 GIS software (ESRI, 2005), the sampling frame was superimposed on a map layer of the study area. A code was given to each section in order to identify that specific area and, the closest village to the middle of the section was used as the sampling point (Fig. 1). In this way, a total of 105 villages were identified for this study of which 91 eventually generated data on sand flies.

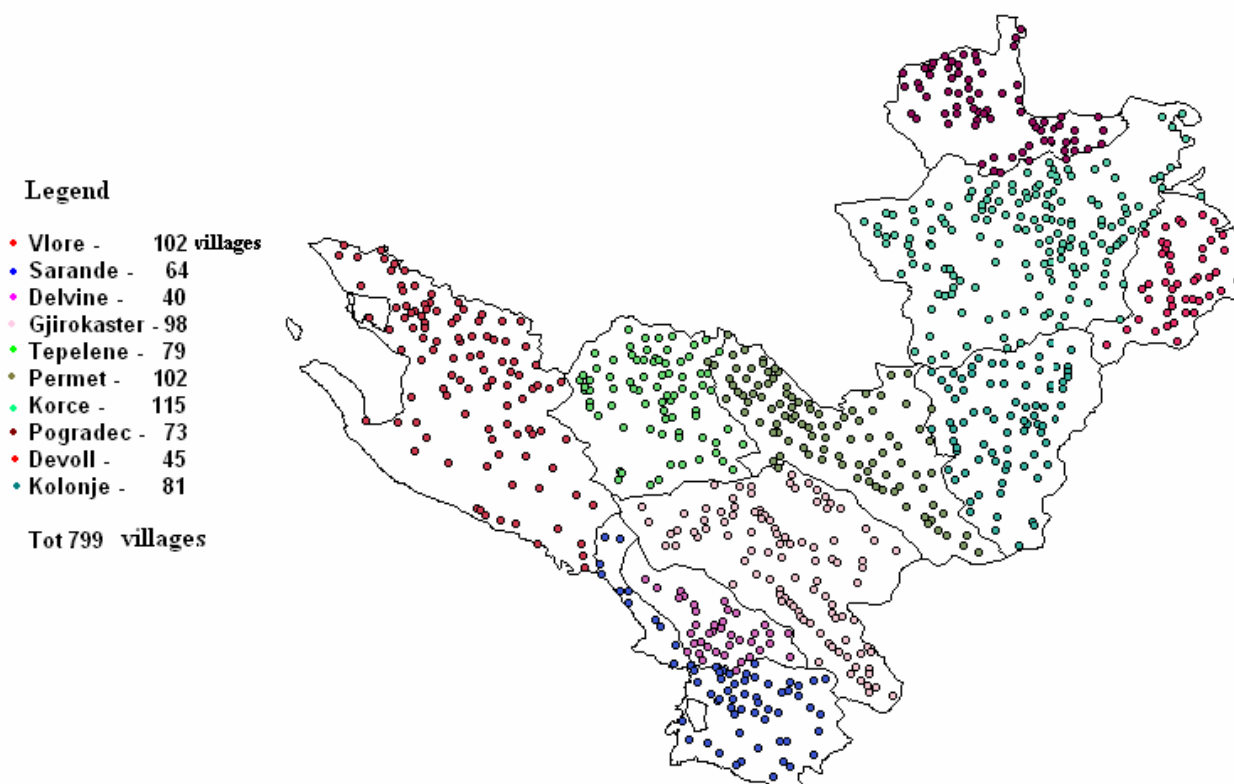


Fig. 1. Sampling zone and the villages within it

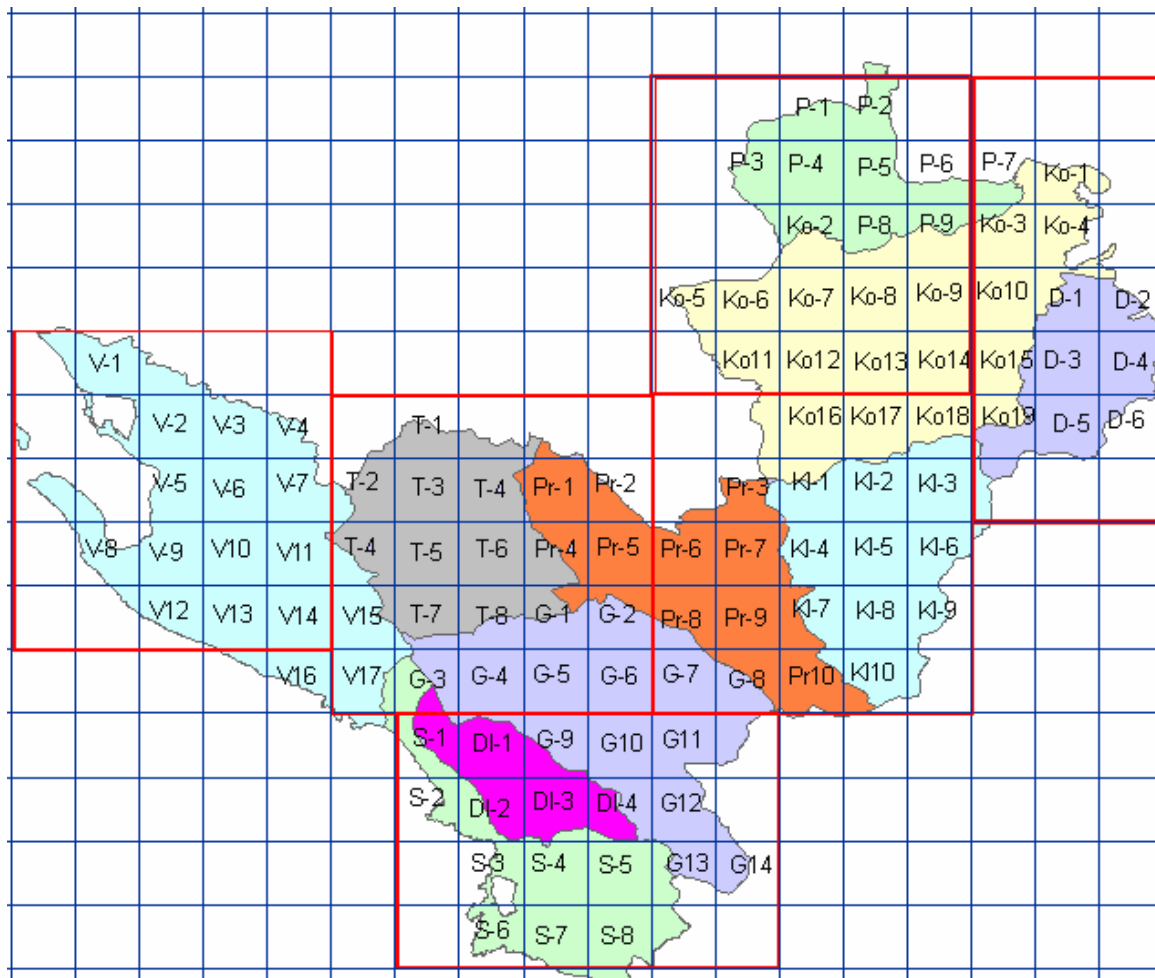


Fig. 2. Sampling zone and the specific quadrants

Sampling protocol

Monitoring activities were carried out by field veterinary officers from May to October 2006. A total of 10 UV-light downdraught traps (manufactured in Onderstepoort, South Africa) were available for the study. The blacklight traps operated only for one night. Farms chosen as trap sites were required to satisfy certain criteria which included i) the presence of at least 5 large livestock e.g. cattle, goats, sheep, pigs, horses or donkeys, ii) being located at least 2.5 km from the coast and iii) insecticides should not have been used during the last six months. Light traps were positioned outdoor within 25 m from where the livestock were kept at night and with the UV-light tube 1.5–2 m above the ground level. They were activated overnight, from ~1 hour before sunset to ~08.00 am of the following morning. The resultant insect catch was poured through a fine gauze square and then transferred to a plastic jar containing 70% alcohol for transportation to the Institute

of Food Safety and Veterinary in Tirana where samples were slide mounted and identified under a Zeiss Axioscop microscope. Only males were identified to species level by their morphological characteristics (Artemiev, 1978; Depaquit et al, 2001; Léger et al., 1985; Léger et al, 1991; Lewis, 1967)

3. RESULTS AND DISCUSSION

A total of 1660 *phlebotomine sand flies* (1314 females and 346 males) were collected (Figs. 3 and 4). From 91 villages monitored, *phlebotomine sand flies* were caught in 48 villages. No *Phlebotomine* were collected in the district of Kolonja, while the district with the highest number of *Phlebotomine* collected was the district of Vlora with 701 *Phlebotomine*, followed by the district of Gjirokaster with 418 and Saranda with 351 *Phlebotomine* (Fig. 5). Five species were identified, three of which belonged to the *Phlebotomus* genus

(all being proven *L. infantum* vectors) and two belonged to the *Sergentomyia* genus. *P. tobbi* was the most widespread species (36.7 %), followed by *Phlebotomus neglectus* (24.5 %), *Phlebotomus perfiliewi* (18.8 %), *Sergentomyia dentate* (12.7 %) and *Sergentomyia minuta* (7.5 %). Their distribution in the southern Albanian districts is represented in the Figure 6, 7, 8, 9, 10.

The highest number of sand flies /trap (519) was caught in August 19th 2006 in the village Lezhan, district of Vlora.

The increase in VL morbidity, 20-40-fold higher than in other southern European countries, could be attributed to increased susceptibility of infants to clinical disease or to variations in Leishmania infection associated with changes in canine reservoir and/or vector populations.

Korçë	Kolonjë	Sarandë	Durrës	Vlorë	Dhuvër	Degradim	Tepelenë	Gjirokastrë	Fier
22	0	265	24	875	1	50	313	63	



Fig. 3. Distribution of females *Phlebotomine* sandflies according to districts

Korçë	Kolonjë	Sarandë	Durrës	Vlorë	Dhuvër	Degradim	Tepelenë	Gjirokastrë	Fier
7	0	66	0	172	0	0	25	108	14

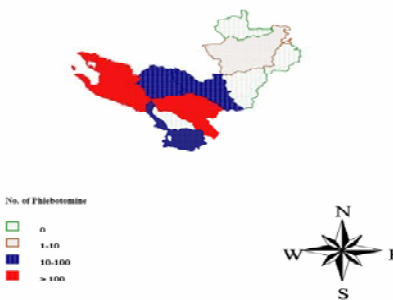


Fig. 4. Distribution of males *Phlebotomine* sandflies according to districts

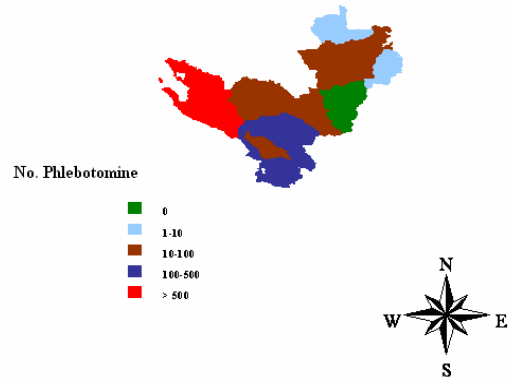


Fig. 5. Distribution of *Phlebotomine* sandflies according to districts

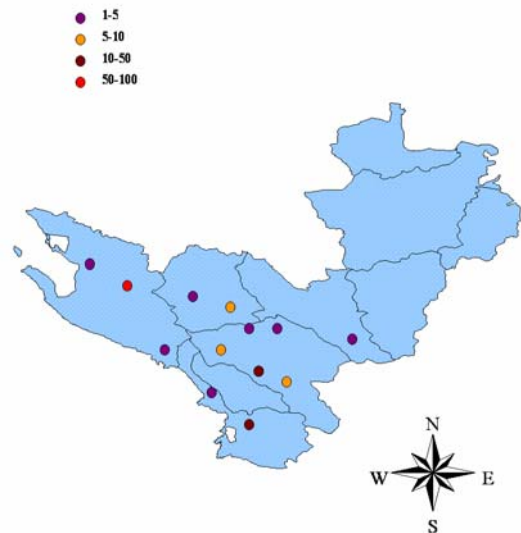


Fig. 6. Distributions of *Phlebotomus tobbi*

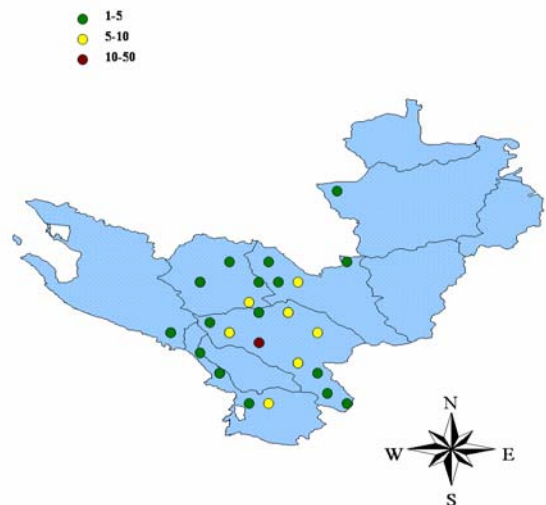


Fig. 7. Distributions of *Phlebotomus neglectus*

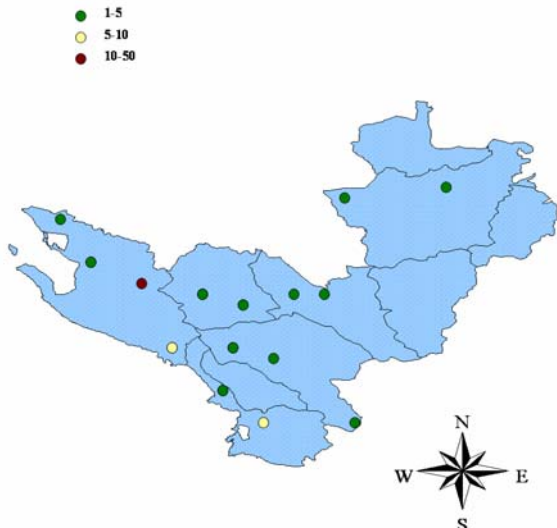


Fig. 8. Distributions of *Phlebotomus perfiliewi*

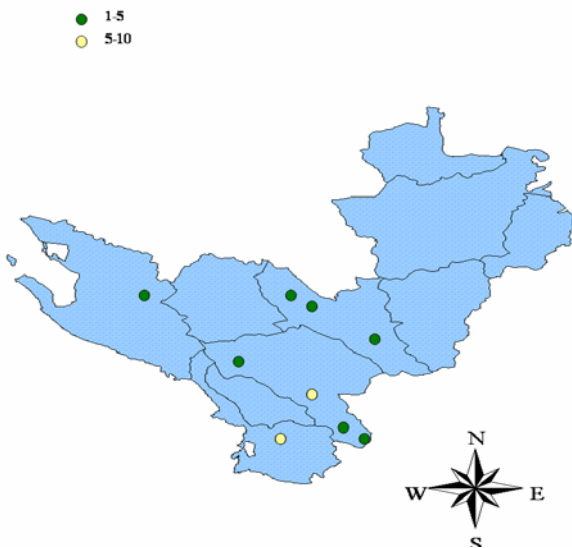


Fig. 9. Distribution of *Sergentomyia minuta*

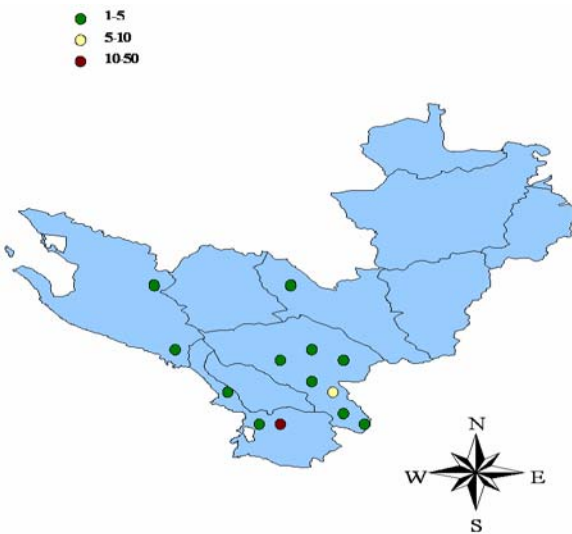


Fig. 10. Distribution of *Sergentomyia dentate*

In general, our survey confirms what was previously observed on the sand fly fauna composition of Albania, and particularly on the distribution and abundance of *P. tobbi* and *P. neglectus* (Velo et al., 2005). The three *Phlebotomus* (*Larroussius*) species, i.e. *P. tobbi*, *P. neglectus* and *P. perfiliewi*, could play a role in the transmission of VL in the area studied, being proven *L. Infantum* vectors (Léger et al., 1988, 2000; Maroli et al., 1987).

In *Phlebotomine* field studies, mechanical light traps, as those designed by Communicable Disease Centers of Atlanta, USA (CDC light traps) are the most convenient and commonly used for monitoring adult sandflies during their nocturnal activity (WHO, 1984). The data presented here highlight that blacklight is effective for sand flies, and thus UV light trap can be a useful tool for their monitoring (Bosnić et al., 2006).

According to the data, we can observe that sand flies in the area studied are active in the coastline and especially in the Vlora district. The districts with a high number of sand flies are the ones closest to the sea probably with a temperate climatic conditions, and the districts in the internal regions are the ones with the low number of sand flies probably because of a more continental climate.

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