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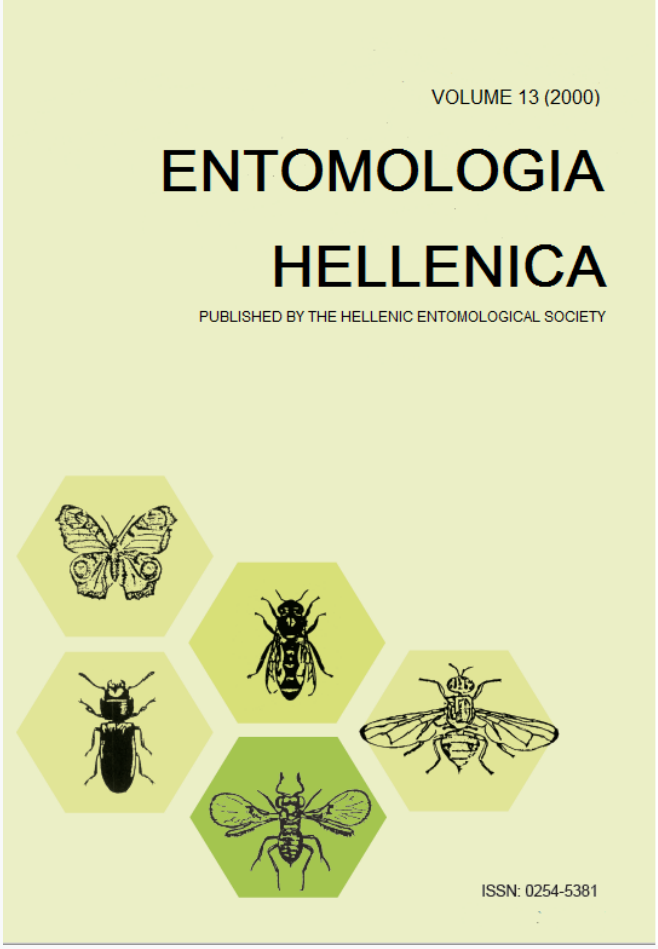

Εξάπλωση Φλεβοτόμων (Diptera: Psychodidae) στη Βόρεια Ελλάδα

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Sandfly (Diptera:Psychodidae) Distribution in Northern Greece[1]

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ABSTRACT

This study is a part of investigations on leishmaniasis vectors which began in 1992. Sandflies were collected in different areas of Kassandra, Sithonia and Athos and in several biotopes of the Xanthi district in Thrace. A total of 811 sandflies were caught using oil-traps in peridomestic sites in the town of Neos Marmaras in 1992, and 4264 specimens were collected by CDC miniature light traps in different parts of Chalkidiki in 1993. Similarly 3465 specimens were collected in Xanthi in 1996. Eight species of sandflies were identified: *Phlebotomus (Larroussius)* neglectus Tonnoir 1921, P. (L.) *tobbi* Adler et al. 1930, P. (L.) *perfiliewi* Parrot 1930, *P. (Paraphlebotomus) sergenti* Parrot 1917, *P. (Adlerius) simici* Nitzulescu & Nitzulescu 1931, *P. (Phlebotomus) papatasi* Scopoli 1786, *Sergentomyia minuta* Rondani 1843 and *S. dentata* Sinton 1933. The roles played in the transmission of leishmaniasis by different species of sandflies is discussed..

Introduction

In Greece, the anti-malarial vector control campaign initiated in 1946 resulted concomittantly in dramatic reduction of sandfly population (WHO 1990). As a consequence, the incidence of leishmaniasis in human populations declined for many years during the anti-malarial vector control program and subsequently.

Leishmaniasis was described early in the 20th century (Cardamatis, 1909). *Phlebotomus (Larroussius) neglectus* Tonnoir 1921, was found implicated as vector for *L. infantum* in Greece (Lèger et al., 1988; Garifallou et al., 1989). Investigations on the Greek sandfly fauna have been carried out in many regions of the country by a number of workers with an interest in entomology and disease. According to those studies there are 12 sandfly species, 9 of which belong to the genus *Phlebotomus* and 3 to the genus *Sergentomyia* (Lèger et al., 1986; Chaniotis et al., 1994; Papadopoulos and Tselentis, 1994). The objective of our field studies was to determine the species composition of sandflies in different parts of Northern Greece.

Materials and Methods

Sandflies were collected in peridomestic places of Neos Marmaras in 1992, in different places of Kassandra, Sithonia and Athos, the three peninsulas of Chalkidiki in 1993, and in the district of Xanthi (Thrace) in 1996.

A total of 811 sandflies were collected from July to October 1992 in domestic and peridomestic sites around of Neos Marmaras (Sithonia) using papers sheets (20×30 cm) smeared with

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olive oil. A total of 4264 sandflies were collected from June to October 1993 in different biotopes of Kassandra, Sithonia and Athos and continental parts of Chalkidiki using CDC miniature light traps. The traps were operated all night and set at irregular intervals in some biotopes and more frequently in others that were considered to be potential sandfly resting sites. In many cases, efforts were focused to collect sandflies in places where dogs lived. The trapped sandflies from paper sheets were removed with a fine brush or probe, washed in detergent water to remove the oil, and stored in 70% ethanol. Sandflies in light traps were immobilized at 4ÆC, separated from other insects and stored also in 70% ethanol. From June to October 1996 a total of 3465 sandflies were collected in domestic and peridomestic sites around of Xanthi (Thrace) using light traps. The identification of the flies was based on taxonomic keys published by Lèger et al. (1986).

Results

Seven sandfly species were among the insects trapped in Neos Marmaras, Sithonia: from a total of 811 collected sandflies, 803 (99%) belonged to the genus *Phlebotomus* and only 8 (1%) to the genus *Sergentomyia*. *Phlebotomus (Larroussius) neglectus* Tonnoir 1921 (80.2%) and *P. (L.) tobbi* Adler et al. 1930 (13.8%) were the dominant species. The other species were *P. (Paraphlebotomus) sergenti* Parrot 1917 (3%), *P. (Adlerius) simici* Nitzulescu & Nitzulescu 1931 (1.9%), *P. (L.) perfiliewi* Parrot 1930 (1.1%), *Sergentomyia minuta* Rondani 1843 (0.7%) and *S. dentata* Sinton 1933 (0.3%). The sex ratio was 683 m: 128 f. Results on the number and species composition of sandflies collected in the area are listed in Table 1.

TABLE 1. Species and number of sandflies collected from July to October 1992 in peridomestic areas of Neos Marmaras, Sithonia, Chalkidiki by oil traps.

Species	Males	Females
P. neglectus	554	96
P. tobbi	95	17
P. sergenti	8	7
P. simici	8	1
P. perfiliewi	13	4
S. minuta	3	3
S. dentata	2	0

A total of 4264 sandflies of eight different species were caught in Kassandra, Sithonia and Athos. The sandflies were identified as: *P. perfiliewi* (52.7%), *P. tobbi* (18.9%), *P. simici* (15.7%), *P. neglectus* (6.6%), *S. dentata* (4.1%), *S. minuta* (1.4%), *P. sergenti* (0.5%), and *P. (Phlebotomus) papatasi* Scopoli 1786 (0.1%). The genus *Phlebotomus* represented about 98% of the sandflies captured. The sex ratio was 1 180 m:3 084 f. Results on the number and species composition of sandflies collected in the area are listed in Table 2.

TABLE 2. Species and number of sandflies trapped in light traps from early June to late October 1993 in several biotopes of Cassandra, Sithonia, the Holy Mount of Athos and other parts of Chalkidiki.

Species	Males	Females
P. perfiliewi	484	1 763
P. tobbi	144	660
P. simici	249	423
P. neglectus	155	127
S. dentata	96	79
S. minuta	14	18
P. sergenti	6	14
P. papatasi	2	1

A total of 3465 sandflies of seven different species were caught in Xanthi. The sandflies were classified as: *P. perfiliewi* (79%), *P. tobbi* (12.20%), *P. simici* (0.20%), *P. neglectus* (6.75%), *S. dentata* (0.99%), *S. minuta* (0.84%), and *P. sergenti* (0.03%). The genus *Phlebotomus* represented again more than 98% of the sandflies captured. The sex ratio was 2223 m:1242 f. Results on the number and species composition of sandflies collected in the area are listed in Table 3.

TABLE 3. Species and number of sandflies trapped in light traps from early July to early October 1996 in several biotopes of Xanthi (Thrace).

Species	Males	Females
P. perfiliewi	975	1762
P. tobbi	141	282
P. simici	2	5
P. neglectus	108	126
S. dentata	10	10
S. minuta	5	24
P. sergenti	0	1

Discussion

Our survey of sandflies in Northern Greece confirmed the occurrence of eight species. The sandfly species *P. alexandri*, *P. balcanicus*, *P. mascitii* and *S. theodori* that have been previously reported to occur in Greece (Lèger et al., 1986) were not found in the present survey. These are some differences in the species composition in the different regions. These differences may be the result of using different collection methods (light traps or oil papers), and of collecting at irregular or regular time intervalls in various biotopes. Seasonal changes and weather conditions can affect the sandfly populations too.

The sandfly fauna of the Mediterranean Basin and its implication in the transmission of *Leishmania* spp. varies in different geographic regions. Sandfly species, like Phlebotomus ariasi and *P. perniciosus* are vectors in France and Italy, whereas *P. sergenti* and *P. neglectus* are vectors in Greece. *P. neglectus* is a proven vector of *L. infantum* in Greece (Lèger et al., 1988).

We expect to shed more light on the leishmaniasis situation in Northern Greece in the future. Current research is aimed at collecting data about the biotopes of the sandflies, their ecology, the prevalence and molecular characterization of *Leishmania* spp. in Northern Greece. Research on the epidemiology, diagnosis and transmission of leishmaniasis is essential in the proposed area of study because the epidemiological significance of domestic and feral dogs and other animals acting as reservoirs of infection, and the roles played in transmission by different species of sandflies, requires more clarification.

Acknowledgements

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KEY WORDS: Diptera, Psychodidae, sandflies, *Phlebotomus*, *Sergentomyia*, Greece.

Εξάπλωση Φλεβοτόμων (Diptera: Psychodidae) στη Βόρεια Ελλάδα

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ΠΕΡΙΛΗΨΗ

Στην παρούσα εργασία αναφέρονται τα αποτελέσματα ερευνών σχετικά με την εξάπλωση των φλεβοτόμων (σκνιπών) στη Μακεδονία και τη Θράκη. Η σύλληψη των φλεβοτόμων έγινε σε περιοχές της Χαλκιδικής (Κασσάνδρα, Σιθωνία και Άθως) και του Νομού Ξάνθης, σε τρεις περιόδους. Για τη σύλληψη των εντόμων χρησιμοποιήθηκαν παγίδες ελαίου και παγίδες με φως. Συνολικά περισυλλέχτηκαν: α) το 1992 στο Νέο Μαρμαρά (Σιθωνία) 811 φλεβότομοι με παγίδες ελαίου, β) το 1993 στην Κασσάνδρα, τη Σιθωνία και τον Άθω, 4.264 φλεβότομοι με παγίδες με φως, και γ) το 1996 σε περιοχές του Νομού Ξάνθης 3.465 φλεβότομοι με παγίδες με φως. Συνολικά ταυτοποιήθηκαν τα εξής 8 είδη φλεβοτόμων: *Phlebotomus (Larroussius) neglectus* Tonnoir 1921, P. (L.) *tobbi* Adler et al. 1930, *P. (L.) perfiliewi* Parrot 1930, *P. (Paraphlebotomus) sergenti* Parrot 1917, *P. (Adlerius) simici* Nitzulescu & Nitzulescu 1931, *P. (Phlebotomus) papatasi* Scopoli 1786, *Sergentomyia minuta* Rondani 1843 και *S. dentata* Sinton 1933. Ορισμένα από τα είδη αυτά είναι πιθανόν να διατελέσουν φορείς *Leishmania* spp. Συζητείται ο ρόλος των ειδών φλεβοτόμων στην επιδημιολογία της λεισμανίασης.