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SANDFLIES OF THE SOUTH PART OF OUAGADOUGOU CITY, BURKINA FASO

SANGARE I.*, GANTIER J.C.**, KOALAGA G.*, DENIAU M.***, OUARI A.* & GUIGUEMDÉ R.T.*

Summary:

Since 1996, the number of cases of cutaneous leishmaniasis has increased dramatically in Ouagadougou. *Leishmania major*, zymodeme MON74 was the only strain isolated in this focus. An epidemiological study of the phlebotomine sandflies fauna has been undertaken. Collections of sandflies have been carried out in six areas of the town during one year with two intensive collections at the end of the dry (May-June) and wet seasons (September-October). The only species of genus *Phlebotomus* captured was *P. duboscqi*. This represented 11.2 % from the 4,676 collected sandflies. *P. duboscqi* is a well known vector of *L. major*, nevertheless, none of the collected sandflies were infected with *L. major*. 16 species of *Sergentomyia* were present in the south area of Ouagadougou and *S. schwetzi* was the most abundant sandfly.

KEY WORDS : *Phlebotomus duboscqi, Sergentomyia, Leishmania major,* Burkina Faso, epidemiology.

Résumé : PHLÉBOTOMES DE LA ZONE SUD DE OUAGADOUGOU, BURKINA FASO

Depuis 1996, le nombre de cas de leishmanioses cutanées n'a cessé d'augmenter dans la capitale du Burkina Faso, Ouagadougou. Un seul zymodème de Leishmania major *a été mis en évidence dans ce foyer, le MON74. Pour débuter les études épidémiologiques, un recensement de la faune phlébotomienne a donc été entrepris. Pour mener à bien les captures, six zones ont été déterminées dans la ville ainsi qu'au sud de l'agglomération, en fonction du nombre de cas de leishmanioses signalés. Les captures se sont déroulées sur une année avec une recherche plus intensive à la fin de la saison sèche (mai-juin) et la fin de la saison humide (septembre-octobre). Une seule espèce appartenant au genre* Phlebotomus *a été capturée. Il s'agit de* P. duboscqi *qui représente 11,2 % des 4676 insectes capturés. Aucune femelle de cette espèce n'a été trouvée infectée par le parasite,* L. major. *16 espèces appartenant au genre* Sergentomyia *ont également été identifiées.* S. schwetzi *est l'espèce la plus représentée.*

MOTS CLÉS : Phlebotomus duboscqi, Sergentomyia, Leishmania major, *Burkina Faso, épidémiologie.*

Ouagadougou, capital city of Burkina Faso, is located in the Sudanese savannah area, inside the widespread focus of sub-Saharan zoonotic cutaneous leishmaniasis (ZCL) where sporadic cases of cutaneous leishmaniasis were reported. But since 1996, the number of cases of cutaneous leishmaniasis has increased dramatically in Ouagadougou, as reported in 2001 (Traore *et al.*, 2001). Human immunodeficiency virus did not seem responsible for this outbreak (Guiguemdé *et al.*, 2003). Studies of phlebotomine sandflies of Ethiopian region have been investigated since 1930, especially by Parrot, Abonnenc and Lewis (Rioux, 1960). Vector incrimination of *Phlebotomus* species needed detailed investigations both to approach the reasons of this outbreak and to propose disease control strategies.

* Service de Parasitologie-Mycologie, INSSA de Bobo-Dioulasso et Faculté de Médecine de Ouagadougou, Burkina Faso.
** Service de Parasitologie-Mycologie, Faculté de Pharmacie, Université Paris XI, rue Jean-Baptiste Clément, 92290 Châtenay-Malabry, France.
*** Service de Parasitologie-Mycologie, Faculté de Médecine de Créteil, UPVM, France.
Correspondence: Jean-Charles Gantier.
E-mail: jean-charles.gantier@u-psud.fr

Collections of sandflies have been carried out in six areas of the town, selected for the highest number of ZCL among the inhabitants. The areas were referenced by a geographical information system (Openshaw, 1996). Collections were carried out once a month during one year from October 2005 to September 2006, using on average four CDC mini-traps (Center for Disease Control) (Fig. 1). They were made during the night from 6 pm to 6 am. Also, point trappings were performed in the same area but inside homes during presumed periods of transmission of the parasite. CDC mini-traps and buccal aspirators were used. Commercial aerosol of pyrethrin was also applied for 20 seconds in the homes and especially in the bedrooms. The insects were collected on a white sheet. Living specimens of female *P. duboscqi* were dissected. Anterior abdomen and medium gut were cultivated in NNN medium when leishmanial promastigotes were suspected. Dissected thorax and anterior abdomens were stored in analytical grade 70 % ethanol for PCR detection of *Leishmania* infections. Pharynx and genitalia of the whole specimens were slide-mounted. These specimens were treated and identified according to Abonnenc & Minter (1965), Abonnenc, (1972), David-

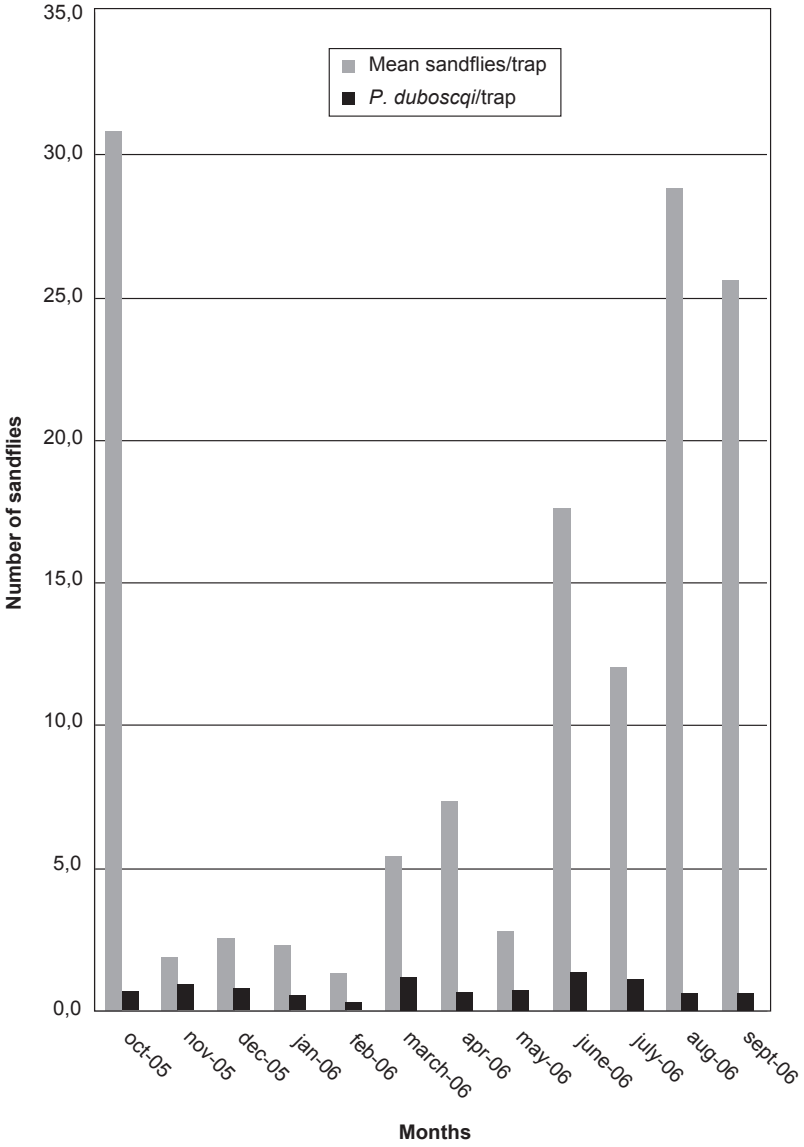

Fig. 1. – Number of trapped sandflies during the longitudinal study (the dramatic percentage of *Sergentomyia versus Phlebotomus* genus is pointed).

son, (1990) and to the recent review of Niang *et al.* (2004).

The longitudinal study showed that the only species of genus *Phlebotomus* collected was *P. duboscqi*. It represented 6.4 % from the 3,836 trapped specimens. But no specimen of *P. duboscqi* was infected with promastigotes.

The cumulated result and the percentage of every trapped species of trappings (yearly longitudinal and the two intensive collections at the end of the wet and dry seasons) are showed in Table I. The increased percentage of *P. duboscqi* (11.2 % from the 4,676 trapped specimens) was probably due to trappings in the homes. 16 species of the genus *Sergentomyia* were present in the south area of Ouagadougou. *Sergentomyia schwetzi* was the most abundant sandfly and it has been found in all areas and represents more than 54 % of the sandflies captured. Its both typical and atypical forms were present with a predominance of the last form. The other dominant sandflies of the genus *Sergentomyia* were *S. antennata* (7 %) and *S. adleri* (7 %) (Table I). In this first study, only the areas of suspected transmission were investigated. Species trapped during this study did not differ from species known in Burkina Faso (Abonnenc & Pastre, 1971), (Maroli *et al.*, 1986); moreover, *P. duboscqi* was the only species identified of the genus *Phlebotomus*. No density comparison can be carried out with previous studies because the trapping methods were different. In our study, the density of *P. duboscqi* was similar outside and inside the human dwellings. For this reason, this species could be considered as a probable main vector of *Leishmania* sp. This species is present all year long but with a low density as shown in Figure 1. This relative scarcity does not exclude that this species could be vector of ZCL as shown in Senegal (Desjeux *et al.*, 1981).

Species	Relative frequency (%)
P. duboscqi	11.25
S. inermis	1.09
S. squamipleiris	0.77
S. ghesquieri	0.41
S. schwetzi	54.79
S. berreri	3.06
S. bedfordi	2.91
S. antennata	7.51
S. buxtoni	2.03
S. fallax	0.77
S. dubia	0.28
S. magna	1.41
S. africana	1.80
S. adleri	7.21
S. affinis-vorax	2.50
S. christophersi	1.75
S. clydei	0.47

Table I. – List and percentage of different species of phlebotomine sandflies trappings (yearly longitudinal and intensive collections at the end of the rainy and dry seasons) from October 2005 to September 2006.

We did not capture specimens of *P. longicuspis* that we found in 2003 in this town but we have confirmed the presence of *Sergentomyia christophersi* in Burkina Faso (Depaquit *et al*., 2005). However, this species trapped in a cattle transit zone in Hamdalaye sector was not investigated in this study.

In the sub-genus *Sergentomyia* presents in Burkina Faso, only *S. schwetzi* is known for its anthropophilic behavior. Other species known for biting humans are *S. magna, S. africana* and some species of the sub-genus *Sintonius, S. adleri, S. affinis-vorax* or *S. clydei*. We were surprised by the high proportion of *S. schwetzi* and by the presence of the typical and atypical forms of this species. The variation of seasonal density of *S. chwetzi* was comparable to that observed by Abonnenc (1972) in Dakkar. According to Davidson (1990), we consider this species as complex, requiring modern studies of genotypic tags.

S. schwetzi is not considered as a vector of *Leishmania* sp. despite its anthropophilic behavior. Parrot *et al*. (1945) had considered this possibility in 1943 but Lawyer *et al*. (1990) could not obtain infectious leishmanial promastigotes from *S. schwetzi*.

Nevertheless, we shall have to complete the investigation of the whole city and concentrate the work on the dissection of *P. duboscqi* and other different *Sergentomyia* female species.

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