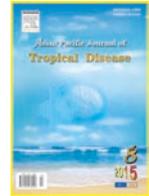




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## Asian Pacific Journal of Tropical Disease

journal homepage: [www.elsevier.com/locate/apjtd](http://www.elsevier.com/locate/apjtd)



Original article doi: 10.1016/S2222-1808(15)60897-0

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### *Leptopsylla taschenbergi taschenbergi* (Siphonaptera: Leptopsyllidae), new flea from Iran

Ali Yousefi<sup>\*</sup>, Mohammad Reza Chaechi Nosrati, Alisina Karimi, Soheila Naisi

Department of Pathobiology, Science and Research Branch, Islamic Azad University, Tehran, Iran

#### ARTICLE INFO

##### Article history:

Received 14 Apr 2015

Received in revised form 11 May 2015

Accepted 19 May 2015

Available online 8 Jul 2015

##### Keywords:

*Leptopsylla taschenbergi taschenbergi*

Siphonaptera

Flea

*Apodemus sylvaticus*

Iran

#### ABSTRACT

**Objective:** To access the emerging ectoparasites associated with rodents of Razan plain, Iran.

**Methods:** Host (*Apodemus sylvaticus*) was collected by live trap in November 2011. The fleas isolated from infested specimen were cleared in 10% aqueous potassium hydroxide, dehydrated in ethanol, cleared in xylene, mounted in Canada balsam and identified using reliable keys.

**Results:** Eight fleas (3 males, 5 females) were collected from *Apodemus sylvaticus* in Razan plain, Western Iran. The fleas were identified as *Leptopsylla taschenbergi taschenbergi*.

**Conclusions:** Fleas are vectors of several important zoonoses for human and wide variety of disease agents for domestic animals. This is the first record of this species from Iran.

## 1. Introduction

Fleas (Siphonaptera) represent a relatively small order of secondarily wingless bloodsucking insects. Adult fleas are obligate bloodsucking parasites of warm-blooded vertebrates and 94% of the known species occur on mammals, the remaining 6% on birds. Analysis of flea-host associations demonstrated that 70% of all flea-mammal associations involve rodents[1]. Fleas are important as vectors of disease agents and helminth parasites of man and animals. In addition, fleas are problematic and occasionally in some humans, severe allergic reactions occur to flea saliva.

*Leptopsylla* is one genus of the family of Leptopsyllidae and has nine species, including *Leptopsylla taschenbergi*, which also has four subspecies, namely, *Leptopsylla taschenbergi amitina* Jordan and Rothschild, 1914; *Leptopsylla taschenbergi calamana* Jordan, 1951; *Leptopsylla taschenbergi cressida* Peus, 1954; *Leptopsylla taschenbergi taschenbergi* (*L. taschenbergi taschenbergi*) Wagner, 1898[2]. This genus occurs in mammalian, especially in Rodentia order and normally is present in the Palearctic ecozone and one species

*Leptopsylla segnis* (*L. segnis*) is known as a cosmopolitan flea[2]. Previous research on Siphonaptera reported two species of *Leptopsylla* in Iran [*L. segnis*][3], *Leptopsylla aethiopicus aethiopicusaethiopicus* (*L. aethiopicus aethiopicusaethiopicus*)[4]. This paper is the first report of new species *L. taschenbergi taschenbergi*.

## 2. Materials and methods

Rodent [*Apodemus sylvaticus* (*A. sylvaticus*)] was collected using live trap in November 2011. *A. sylvaticus* infested with fleas, during the study on ectoparasites of rodents in Darjazin village located in Razan plain (Hamadan Province) of Iran. Eight fleas (3 males, 5 females) were collected by brushing the skin, preserved in 70% ethanol containing 5% glycerin and subsequently in parasitology laboratory, cleared in 10% aqueous potassium hydroxide then rinsed several times in distilled water to remove all traces of clear solution. The specimens were then dehydrated in increasing concentrations of ethanol, cleared in xylene and mounted in Canada balsam and identified with aid of references book[2,3].

## 3. Results

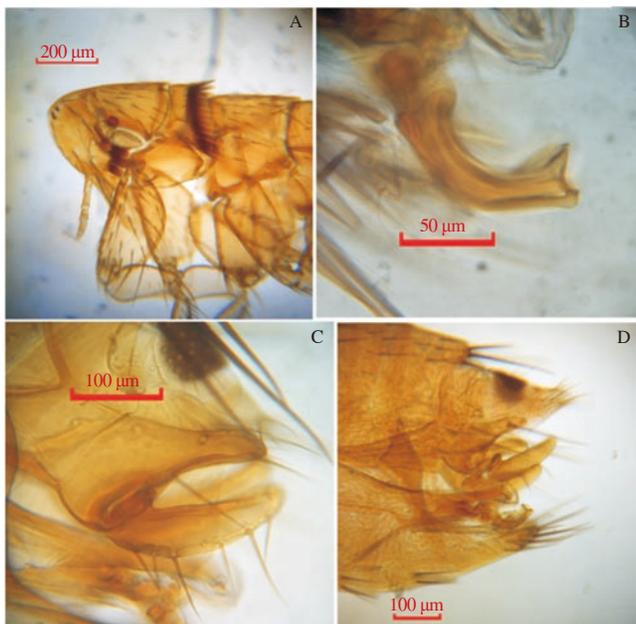
According to the keys of Hopkins and Rothschild, the following

<sup>\*</sup>Corresponding author: Ali Yousefi, Department of Pathobiology, Science and Research Branch, Islamic Azad University, Tehran, Iran.  
Tel: +989183075573  
E-mail: A.usefi@srbiau.ac.ir

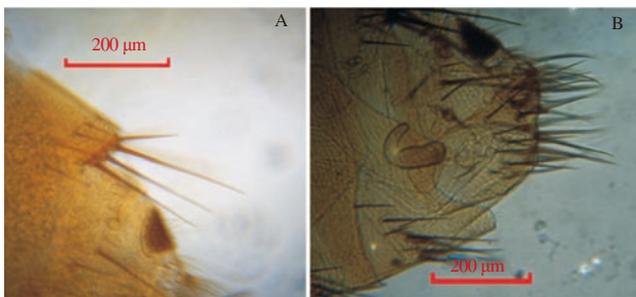
characters were used to identify the *Leptopsylla* spp. from the other genus of Leptopsyllidae[2].

In *Leptopsylla* Jordan and Rothschild, 1911 genus, genal comb usually composed of 3 or 4 spines, but in two species *Leptopsylla putoraki* and *Leptopsylla sexdentata*, genal comb composed of 5 or 6 spines. Processes of male clasper are relatively short and their tips are not darkened by sclerotisation.

According to the keys, the flea was identified as *L. taschenbergi taschenbergi* Wagner, 1898 (Siphonaptera: Leptopsyllidae). Morphological characteristics of specimens were as follows: generally genal comb of 3 spines in both sexes (Figure 1A) and in male, paramere strongly bent, boomerang-shaped (Figure 1B); movable process often stouter and straighter (Figure 1C); apico-posterior angle of crochet forming a projection with concave or truncate apex (Figure 1D) and in female, without a broad interspace between the two groups of antepygidial setae on each side (Figure 2A); sinus of seventh sternite broader and lobe above it broadly triangular (Figure 2B).



**Figure 1.** Male *L. taschenbergi taschenbergi* from *A. sylvaticus*. A: Anterior end; B: Paramere; C: Clasper; D: Posterior end.



**Figure 2.** Female *L. taschenbergi taschenbergi* from *A. sylvaticus*. A: Antepygidial setae; B: Sinus of sternite VII.

#### 4. Discussion

*L. taschenbergi taschenbergi* and different subspecies of *Leptopsylla taschenbergi* are host-specific fleas and usual host

for them are the species of the *Apodemus* genus, however these fleas were reported from other species of rodents. *L. taschenbergi taschenbergi* has a distribution in palaeartic regions from Caucasus to Northern Greece and was reported from different countries including: Russia, Romania, Greece and Bulgaria. however this is the first report of this flea from Iran[2,5].

There are approximately 2500 described species and subspecies in Siphonaptera order in the world. In this article, we reported third species of *Leptopsylla* genus in Iran and *L. segnis* and *L. aethiopicus aethiopicus* have already been reported[3,4].

As mentioned above, flea bites are annoying and in some cases cause irritation, itching and rash and they are vectors of variety of important zoonoses agents, including *Rickettsia typhi*, *Rickettsia felis*, *Yersinia pestis* (*Y. pestis*), *Bartonella henselae*, *Diplidum caninum*, *Hymenolepis nana* and *Hymenolepis diminuta*.

In *Leptopsylla* genus, few studies have been carried out on disease agents and *Rickettsia typhi* and *Y. pestis* were reported from *L. segnis*, though this flea as a weak vector of *Y. pestis* according to old standards[6,7]. About *L. aethiopicus aethiopicus*, agents such as *Bartonella* sp. and *R. felis* were reported[8].

Considering all aforementioned facts, it is crystal clear that study on ectoparasites is important to recognize the disease agents' vectors which associated with animals in every geographical area for efficient control and elimination programs.

#### Conflict of interest statement

We declare that we have no conflict of interest.

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