

Confirmation of *Meriones libycus* (Rodentia; Gerbillidae) as the Main Reservoir Host of Zoonotic Cutaneous Leishmaniasis in Arsanjan, Fars Province, South of Iran (1999-2000)

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Key Words: *Leishmania major*, *Meriones Libycus*, Fars, Iran

ABSTRACT

This study was carried out in Arsanjan county Fars province, a new focus of ZCL, during 1999-2000. Totally fifty nine *Meriones libycus* captured by live traps and four out of them (6.8%) were naturally infected with parasites. Parasites were cultured in monophasic medium RPMI 1640 and isolated promastigotes were identified using RAPD-PCR test in Medical Parasitology Unit of Shiraz University of Medical Sciences. The results showed that parasites were *L. major*, so, *Meriones libycus* was known the principal reservoir of ZCL in the rural region of Arsanjan. *Rhombomys opimus* and *Tatera indica* were absent in the study areas.

INTRODUCTION

Zoonotic cutaneous leishmaniasis (ZCL) is an important health problem in Iran and there are several foci of the disease in the country. The main focus of disease is in Isfahan province, central Iran. *Rhombomys opimus* is the principal reservoir of the disease and the secondary in importance is *M. libycus erythrourus* (4, 5). The first species has been reported as the main reservoir of ZCL in the north and east of Iran as well as southern region of Tehran (1, 2, 4, 7, 9).

In the west and south west of Iran the indian gerbil, *Tatera indica* is primary and *Nesokia indica* or *M. libycus erythrourus* are the secondary reservoir of the disease (1, 2). In the south east of country (Baluchistan), *M. hurrianae* plays as a main and *Tatera indica* as a secondary reservoir host of disease (8).

The present paper shows, the result of the nature of parasite which has been isolated and identified from *M. libycus erythrourus* in Arsanjan, Fars province, Iran.

MATERIALS AND METHODS

The study was carried out in the rural region of Arsanjan county (the villages of Khan-Abad, Jaafar-Abad, Rahim-Abad and Kouroush-Abad) south of Iran during the 1999-2000.

Rodents were captured by live traps baited with roasted walnut. First, the active colonies of rodents were recognized, then, the live traps were put near the animal burrows in the morning (9 am) and evening (6 pm) once a month.

In laboratory, impression smears were captured from the ears of the rodents and examined under the microscope. Samples from infected rodents were injected sub cutaneously at the base of the tail of laboratory mice, balb/c. The parasites from infected

balb/c mice were cultured in monophasic medium RPMI 1640 and identified by the method of RAPD-PCR.

RESULTS

Totally eighty three (83) rodents were collected, including *Meriones libycus* (71%), *Cricetulus migratorius* (22%) and *Microtus arvalis* (6%) (Table 1). All of the rodents were examined for parasites infection. The result showed 4 out of 59 *Meriones libycus* (6.8%) were infected with amastigotes (Table 2). Parasites from infected rodents were injected subcutaneously into 10 Balb/c mice. Nodules and ulcers containing numerous amastigotes, appeared within 20 days in six mice. Parasites of two infected Balb/c were cultured into monophasic medium (RPMI 1640) and indentified as *L. Major* using RAPD-PCR test.

This study showed that, *Meriones libycus* was the principal and main reservoir host of ZCL in the rural region of Arsanjan. Mean time *Rhombomys opimus* and *Tatera indica* were absent in these areas.

DISCUSSION

L. major was isolated as the causative agent of ZCL from *M. libycus erythrourus* in Arsanjan, Fars province, south of Iran.

In the recent decade, in the areas of southern Isfahan down to Fars province (such as Badroud and Arsanjan) human cases of ZCL were observed to be endemic, not sporadic, and *M. libycus* the main and exclusive reservoir of disease, as its parasite infection rate were reported 6-25% (6, 10), while in the other ZCL areas, where *Rhombomys opimus* or *Tatera indica* are the main reservoir hosts of disease, this species has secondary role as a reservoir host. For example, in Isfahan,

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Lotf-Abad, Esfarayen and Bekran Shahroud, *Rhombomys opimus* was observed with high infection rate, 60%, 44%, 100% and 64.8%, respectively (1, 4), while *M. libycus* has been reported with low infection rate (1-3%) in these areas. Also in the west and south-west of Iran, *Tatera indica* was observed with 12.5% infection rate, whereas *M. libycus* with only 3% infection rate (2), and in these areas *M. libycus* does not play main role for maintenance of disease. The high density population of *R. opimus* and *T. indica* in these areas must not be forgotten in comparison with *M. libycus*.

On the other hand *M. libycus* in south Isfahan and Fars (Badrood & Arsanjan) has been reported with high (up 25%) infection rate, where *Rhombomys opimus* and *Tatera indica* were absent, so in these areas, this infection rate (25%) will be enough for stability and maintenance of disease.

ACKNOWLEDGEMENT

We are very thanks to Mr. Kamali and other staff of training and Research Center of Kazerun School of Public Health & Institute of Health Research, Tehran University of Medical Sciences for their assistance in the field work.

Table 1. Fauna and density of captured rodents in Arsanjan, Fars province, 1999-2000

Villages Species	Khan-Abad	Jafar-Abad	Rahim-Abad	Kouroush - Abad	Captured Rodent	
					No.	%
<i>Meriones libycus</i>	29	9	12	9	59	71
<i>Critetulus migratorius</i>	9	2	1	6	18	22
<i>Microtus arvalis</i>	2	1	2	1	6	7
Total	40	12	15	16	83	100

Table 2. Leishmania infection in rodents captured from Arsanjan county, 1999-2000

Species of rodents	No. of Examined	No. of Positive	Infected rodents (%)
<i>Meriones libycus</i>	59	4	6.8
<i>Critetulus migratorius</i>	18	0	0
<i>Microtus arvalis</i>	6	0	0

REFERENCES

- Javadian E (1988): Reservoir host of cutaneous leishmaniasis in Iran. *Abstracts of XIIIth international congress for Tropical Medicine and Malaria*, 18-3 September 1988, Amsterdam, the Nether lands, P:52.
- Javadian E, Dehestani M, Nadim A, Rassi Y, Tahvildar-Bidruni Ch, Seyedi-Rashti MA and Shadmehr A (1998): Confirmation of *Tatera indica* (Rodentia: Gerbillidae) as the main reservoir host of

zoonotic cutaneous leishmaniasis in the west of Iran. *Iranian J Publ Hlth*, **27** (1-2): 55-60.

- Javadian E, Nadim A, Tahvildar-Bidruni Gh and Assefi U (1976): Epidemiology of cutaneous leishmaniasis in Iran. B. Khorassan area., part V: report on a focus of zoonotic cutaneous leishmaniasis in Esferayen. *Bulletin de la Societe de Pathologie Exotique*, **69**: 140-3.
- Nadim A and Faghil M (1968): The epidemiology of cutaneous leishmaniasis in the Isfahan province of Iran. I. The reservoir. I. The human disease. *Trans action of the Royal Society of Tropical Medicine and Hygiene*. **61**: 534-42.
- Nadim A, Seyedi-Rashti MA and Mesghli A (1968): Epidemiology of cutaneous leishmaniasis in Turkaman Sahra, Iran. *J Trop Med Hyg*, **71**: 238-9.
- Rassi Y, Jalali M, Javadian E and Motazedian MH (2001): Confirmation of *M. libycus* as the main reservoir host of zoonotic cutaneous leishmaniasis in Arsanjan county. Fars province, south of Iran. Second congress on leishmaniasis, Crete, Greece, May 20-24, No.166 (oral section).
- Seyedi-Rashti MA and Nadim A (1967): Epidemiology of cutaneous leishmaniasis in Iran. B. Khorassan area, Part I: the reservoirs. *Bulletin de la societe pathologie exotique*, **60**: 510-18.
- Seyedi-Rashti MA and Nadim A (1984): Cutaneous leishmaniasis in Baluchistan Iran. Abstract and poster, Volume XI, International Congress for Tropical Medicine and Malaria. Calgary, Canada, 16-22 September, P:124.
- Seyedi-Rashti MA and Salehzadeh A (1990): A new focus of zoonotic cutaneous leishmaniasis near Tehran. Iran. *Bulletin de la societe francaise de parasitologie*, **8**, supplement 2, 1145 (Abstract).
- Yaghoobi-Ershadi MR, Akhavan AA and Moheali M (1961): *Meriones libycus* and *Rhombomys opimus* (Rodentia: Gerbillidae) are the main reservoir host in a new focus of zoonotic cutaneous leishmaniasis in Iran. *Transaction of the Royal society of Tropical Medicine and Hygiene*. **90**(5): 503-4.