

Short communication

***Meriones libycus* is the main reservoir of zoonotic cutaneous leishmaniasis in south Islamic Republic of Iran**

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الزُّبُود اللَّيْبِي هُوَ الْمُسْتَوْدَع الرَّئِيسِي لِدَاءِ اللَّيْشْمَانِيَاتِ الْجُلْدِيِّ الْحَيَوَانِيِّ الْمَصْدَرِ فِي جَنُوبِ جُمْهُورِيَةِ إِيرَانَ الْإِسْلَامِيَّةِ

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الخلاصة: أُجريت دراسة في المناطق الريفية المحيطة بمدينة نيريز، ومقاطعة فارس في جنوب جمهورية إيران الإسلامية خلال المدة 2002 – 2003، لتَقْصِي وجود بؤرة جديدة من داء الليشمانيات الجلدي الحيواني المصدر. ووُجد أن الزُّبُود اللَّيْبِي *Meriones libycus* هو القارض السائد (100% من 65 قارضا تم صيدها)، بينما أصيب 4.6% بصورة طبيعية بالليشمانية الطفيلية. وتم تحديد المشيقات على أنها الليشمانية الكبيرة *L. major*، مما يؤكد أن الزُّبُود اللَّيْبِي يُمَثِّلُ الْمُسْتَوْدَع الرَّئِيسِي لِدَاءِ اللَّيْشْمَانِيَاتِ الْجُلْدِيِّ الْحَيَوَانِيِّ الْمَصْدَرِ فِي الْمَنَاطِقِ الْجَنُوبِيَّةِ مِنَ الْبِلَادِ.

ABSTRACT A study was made in rural regions around Neiriz city, Fars province in the south of the Islamic Republic of Iran during 2002–03 to further investigate a new focus of zoonotic cutaneous leishmaniasis. *Meriones libycus* was the dominant rodent (100% of 65 rodents collected) and 4.6% were naturally infected with the amastigote form of *Leishmania* spp. Promastigotes were identified as *L. major*. This confirms *M. libycus* as the main reservoir host of zoonotic cutaneous leishmaniasis in southern parts of the country.

***Meriones libycus*, principal réservoir de leishmaniose cutanée zoonosique dans le sud de la République islamique d'Iran**

RÉSUMÉ Une étude a été réalisée dans une région rurale autour de la ville de Neiriz, province de Fars, dans le sud de la République islamique d'Iran durant les années 2002-2003 pour approfondir les recherches sur un nouveau foyer de leishmaniose cutanée zoonosique. *Meriones libycus* était le principal rongeur (100 % des 65 rongeurs capturés) et 4,6 % étaient naturellement infectés par la forme amastigote de *Leishmania* sp. Les promastigotes ont été identifiés comme *L. major*. Ceci confirme que *M. libycus* est le principal réservoir hôte de la leishmaniose cutanée zoonosique dans les parties méridionales du pays.

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Introduction

Zoonotic cutaneous leishmaniasis (ZCL) is an important health problem in many countries of the Mediterranean area as well as in the Islamic Republic of Iran. There are several foci of disease in the country [1–11]. In the last decade, the annual incidence of ZCL has been rising gradually; the total number of cases increased from 1560 to 3861 during 1991–2001 (unpublished data, Ministry of Health, Islamic Republic of Iran). In 1999 a new focus of ZCL, with a high incidence (850.9 per 100 000), was found in some villages of Arsanjan city, Fars province, in the southern part of the Islamic Republic of Iran. Increasing sandfly–human contact is believed to be occurring due to agricultural development in many parts of these areas and this leads to more exposure to infection. Detection of *Leishmania* spp. is not always easy in wild rodents, because the parasite may cause no or only minor skin lesions in these animals [12].

A previous study in Arsanjan showed that *Meriones libycus* was the principal reservoir of ZCL in the area [13]. The objective of the present study in Neiriz, an adjacent city to Arsanjan, was to collect further data from this new focus of ZCL.

Methods

The study was carried out in rural areas around Neiriz city, Fars province (28 42 N, 53 25 E, altitude 1620 m). The population was 96 929 in 1996 and their main activities are agriculture and animal farming.

Rodents were captured monthly by Sherman live traps baited with roasted walnuts during October 2002 to March 2003 from the villages of Gasseem-Abad, Gale-Bahman and Kooh-Sorkh. After identifying active colonies adjacent to selected villages, traps were set near the rodent's burrows in

the mornings and evenings twice a month. Rodents were identified according to the national systematic key [14].

Impression smears were taken from the rodents' ears and investigated microscopically for amastigotes. Smears from infected animals were injected into Balb/c mice. The parasites from infected mice were cultured and the isolated promastigotes were identified from nested polymerase chain reaction (PCR) techniques, using standard methods [15], as described in our earlier paper [13].

Results

In Neiriz city, 65 rodents were collected during the study period; all (100%) were identified as *M. libycus*. Three (4.6%) were infected with amastigotes. Isolated parasites were injected into 10 mice; nodules and ulcers were recognized in 5 mice after 1 month. The promastigotes isolated were identified as *L. major* using PCR.

Discussion

This finding in Neiriz confirms our previous study in Arsanjan [13] that *M. libycus* is the main reservoir host of ZCL in southern Islamic Republic of Iran. No other species (for example *Rhombomys opimus* or *Tatera indica*) were captured in the study areas. *L. major* has been isolated from *M. libycus* in central parts of the Islamic Republic of Iran [16], Uzbekistan [17], the Libyan Arab Jamahiriya [18] and Saudi Arabia [19].

There are currently 3 zones of ZCL in the Islamic Republic of Iran. The 1st zone is the centre and north-east, including Isfahan, Esfarayen, Lotf-Abad and Bekran-Shahrood. The great gerbil, *R. opimus*, is active in these areas and shows high infection rates (44%–100%) [1,5,7]. The 2nd zone is located in the west of the Islamic Republic

of Iran, where *T. indica* is the primary and main reservoir of disease with a 12.5% infection rate [7,9]. In both the above zones, *M. libycus* is a secondary reservoir host with a low infection rate and does not play a key role in maintaining the disease. The 3rd zone is in the south-east in Baluchistan [11]. Here *M. hurrianeh* is the main reservoir; we have not captured *M. libycus* from Baluchistan. In recent years, human cases of ZCL were observed to be endemic in Isfahan (central Islamic Republic of Iran), which borders Fars province. In this region, *M. libycus* is the main reservoir with a high infection rate (6.8%–25%) [13,16,20].

According to our findings, it seems that a 4th zone of ZCL has become established in the south of the Islamic Republic of Iran. In this area, *M. libycus* is the primary and main reservoir host of the disease, and

R. opimus and *T. indica* were absent. We suggest that ZCL may be increasing in the southern region due to the proximity of rodent burrows to people's houses (about 100 m) and increased agricultural activity and rural development in these areas. These factors facilitate more human contact with the rodent–sandfly–rodent cycle transmission of leishmaniasis.

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