



Naragh Suburb, Center of Iran; A Natural Habitat of *Hirudo medicinalis*

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ABSTRACT

Aims A very common species of leeches has been named as *Hirudo medicinalis*. Regarding to the application of leeches in medicine and their fast extinction, this study was performed in aquatic habitats of Kashan aimed to determine the distribution of leeches and to provide information about their regional and habitat characteristics.

Materials & Methods This descriptive study was conducted during 2008 to 2010 in three periods and 90 samples from 30 sites were collected, totally. 30 lentic and lotic aquatic habitats located in different regions of Naragh were recognized and selected. Leeches were collected initially in 10% ethanol followed by washing and removing mucus and then maintained in 70% ethanol. The identification keys were used for recognizing the species of leeches.

Findings According to the identification key of the leech species, 15 samples from the total samples of 30 locations were *Hirudo medicinalis*. Total *Hirudo medicinalis* samples were collected just from Naragh River. These species of leeches were relatively large with 7-10cm and their colors were olive green, brown and greenish brown with a red stripe on the sides.

Conclusion Naragh River is one of the habitats of *Hirudo medicinalis*.

Keywords *Hirudo medicinalis*; Leeches; Ecosystem

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Introduction

Blood suckers have been used by human beings for medical purposes for hundreds of years. A very common species of leeches has been named by Carl Linnaeus as *Hirudo medicinalis* [1]. In ancient times, medical leeches were used for treating arthritis, blood clotting, varicose veins, some circulatory disorders and also discharging the patient's blood and balancing her body. The first medical use of leeches was related to the Greek, Nicander of Colophon. The uses of leeches were also explained by Avicenna and Abdullatif Albaghdadi [2, 3]. At the end of the 19th century, the use of leeches was declined [4]. Today, these creatures are used for micro surgeries [5] and plastic and reconstructive surgeries to stimulate blood flow in organs such as eyelids, fingers and ears [6].

Only adult leeches are capable to penetrate thick skin of birds and mammals. The period of blood-eating are short, 20-30 minutes [1], and the weight of leeches become ten times more than their actual weight. Each leech sucks 5-12ml of blood and can live up to a year between blood meals [4]. After leeches feed, the blood flows from the attachment site for up to an hour and the wound may ooze for up to 5 hours. The wound irritation and itching may be delayed. Secondary infections of the bite site can also occur [7].

Leeches put their eggs within the cocoon given from the skin secretions and then put them in moist soil. Young leeches are fed with liquid protein diets which are located inside the cocoon. After four weeks, leeches exit from eggs and leave cocoon and then eat liquid of amphibious body because the skin of amphibious are very thin for leeches jaws [1]. The researchers suggest that the mortality of frogs, toads and newts has related to leech attacks in different parts of Europe [8]. Leech body is sensitive to touch; by touching their bodies, the length of them decreases and their muscles contract [8]. In general, medical leeches live in ponds and lakes with high summer temperatures [9] and fresh water pools [4]. Medical leeches live two, three or four years depending on habitat conditions [9]. Their living ranges are across Europe [10] to Asia and even up to Kazakhstan and Uzbekistan [4]. Suwyer had identified the risks related to the survival of medical leeches and gave the necessary information in the

IUCN Invertebrate Red Data Book [11, 12]. According to Wells *et al.*, decreasing the medical leeches is due to habitat and agricultural practices changes [12]. Relatively high temperature and habitat growth lead to increase of host searching and probably decreasing the population of leeches [9]. Elliott & Tullet recorded the presence of medical leeches at seven locations in Britain [13]. Medical leeches are regarded as protected live species and classified as a rare species in British red data books [12]. The medical leeches are protected in Britain by its inclusion in Schedule 5 of the Wildlife and Countryside Act (1981). They are also prevented from killing, injuring, possessing or selling (living or dead) and damage, destruction or blocking their habitats [14].

Regarding to the application of leeches in medicine and their danger of population extinction, this study was performed in aquatic habitats of Kashan aimed to determine the distribution of leeches and to provide information about their regional and habitat characteristics.

Materials & Methods

This descriptive study was conducted during 2008 to 2010 in three periods and 90 samples from 30 sites were collected, totally. 30 lentic and lotic aquatic habitats located in different regions of Naragh were recognized and selected. Naragh region is 15km far from Kashan-Delijan road (50°84' 44" longitude and 33°00' 59" latitude) and its height from sea level is 1660m. This region is surrounded from three sides by mountains with the mountainous climate. From the north it is closed to the Al Mountain and in the east it is 18km far from Delijan town and in the south it ends to Sinaghan village. The city is about 70km² and its rainfall is approximately 200mm. Fresh water of Naragh River is continual and in the beginning of spring its flow is more and at the end of summer and beginning of autumn is low. In the recent years, due to drought condition in the end of summer, water flow has being stopped. The stream originates from the Jasb mountain region and its bed is rocky bed.

The selected habitats were studied during three years at spring and summer and in each habitat, 5 points were surveyed. In each point of sampling, stones and aquatic plants, wood

slices and floatable root of plants in water were relocated with hand and exit from water and finally leeches were collected with hand and forceps. Leeches were collected initially in 10% ethanol followed by washing and removing mucus and then maintained in 70% ethanol. The identification keys were used for recognizing the species of leeches. The details of leech morphology were accommodated to the above-mentioned keys [3, 13, 15, 16].

Findings

The study areas included Khunche, Niasar, Ghamsar, Maraq lentic water, lotic water Maraq, Ghahrood water dam, Ghahrood lotic water dam, Gulistaneh, Barzok, Dehzireh, Abshirin, Shourab, Khom, Abyaneh, Joshaghan, Nashalj, Jovinan, Naragh and Mazgan. According to the identification key of the leech species, 15 samples from the total samples of 30 locations were *Hirudo medicinalis* (Figure 1).



Figure 1) *Hirudo medicinalis* collected from Naragh suburb (in water)

Total *Hirudo medicinalis* samples were collected just from Naragh River. These species of leeches were relatively large with 7-10cm and their colors were olive green, brown and greenish brown with a red stripe on the sides.

Discussion

Hirudo medicinalis exist limited only at a recognized region in central area of Iran; Markazi and Isfahan provinces and just at Naragh region. It seems, despite little amount of water in Kashan region, the annual average temperature has caused the presence of aquatic animals from the annelid worms order. However, their frequency is not very high.

Grosser & Pešić show *Hirudo medicinalis* exist at least in 23 countries including Albania, Australia, Great Britain, Bulgaria, Czech, Slovakia, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Luxembourg, Netherlands, Norway, Poland, Romania, Spain, Sweden and Switzerland [17]. These researchers had traveled to Iran in 2003-2005. The first trip was to the provinces of Kerman, Mazandaran, Markazi, Isfahan, Yazd, Hamadan, Chahar Mahal & Bakhtiari and the second trip was to the provinces of Khorasan, Markazi, Lorestan, Kermanshah and Mazandaran. Their study shows the fauna of leech weak in Iran and their species belong to animal geographical region as Palaearctic with European species and *Hirudo* genus were hunted in Mazandaran [17].

In Ireland, this animal was not found over 100 years and in Britain, Netherland and Norway was rare temporarily and now a limited population is remained in these regions [9]. Medicinal leeches were recorded in 1970 in 16 sites and in 1980 just in 12 sites of Britain [12]. According to Elliott & Kutschera, lack of medicinal leeches is because of the destruction of wetlands, autotrophic and fungi ponds. Destruction of water supplies often caused amphibian obviation. Larvae and maturation of toads, frogs and newts are the main sources for leech bleeding. Thus, correct management of suitable habitats is needed to protect leeches and their hosts [13]. Perhaps one of the reasons of decreasing activity and frequency is the lack of food availability and aquatic habitats that affected these organisms. Activity of medicinal leeches reduces in temperature lower than 10°C while 50% of them are active in 19°C and in reaction with water turbulence they swim fast [9].

The major limitation of this research was the limited access to the streams of the region for sampling throughout the year. Recently, due to the rainfall decreases in this region, most of

the permanent water became temporarily. Therefore, possibility of biological activity of animals in these places was not too proper and more sampling was impossible.

Regarding to the occurrence of alternative drought in Naragh region, extinction risk of leech in Kashan and central regions of Iran is very high. Thus it is necessary to study about leeches in different places of Iran to recognize the potential habitats and prevent them from extinction. The presence of leeches is necessary for performing their role and natural equivalence of environment as biological indicators. Zoologists and biologists are recommended to study behavior, biology, biological worth, and probably risk of these species so that we can manage and control them more easily.

Conclusion

Naragh River is one of the habitats of *Hirudo medicinalis*.

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Ethical Permission: The study complies with ethical considerations to work with animals.

Conflict of Interests: None declared by authors.

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