The Economic Importance and Status of Medicinal Leeches in Turkey

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Medicinal leeches are used in the treatment of some diseases since ancient times for medicinal purposes. The best-known and commonly used medicinal leech species are found in *Hirudo* genus. In this study, the potential of medical leeches in the wetlands of Turkey, the situation and the economic importance were examined. Until the last few years, it was believed that all of the medicinal leeches collected and exported from Turkey were *Hirudo medicinalis*. But, medicinal leech of Kızılırmak delta that are vast majority of the leech exported from Turkey was seen to be *Hirudo verbana*. In a recent molecular study, a new species of medical leech, *Hirudo sulukii* was identified in the South East Anatolian Region of Turkey. Almost all of the marsh of seven geographical regions of Turkey can be found medical leeches. Medicinal leeches were applied export quotas 2000 kg in 2015 depending on Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) by the Turkey Ministry of Food, Agriculture and Livestock. However, only 166 kg (8.3%) of this leech quota could be exported.

Keywords: *Medicinal leeches, Hirudo sulukii, Hirudo verbana, Economic importance, Export, Turkey*

INTRODUCTION

There are more than 650 known species of leeches in the *Hirudinea* class. The new medicinal leech species have been defined in the Hirudo genus with the development of genetic science, and also changed to the names of some species of known ones (Saglam et al., 2016; Utevsky and Trontelj, 2005). Medicinal leech species live in freshwater, especially in stagnant marsh and reed areas. The species of medical leech belonging to Hirudo for hirudotherapy are usually used (Singh, 2010).

Turkey is one of the major exporting countries for the medicinal leech. Many studies have been carried out in various regions to determine the leech fauna in Turkey. These studies have also revealed the populations of medical leeches in Turkey (Demirsoy et al., 2001; Duran et al., 2007; Geldiay, 1949; Kasparek et al., 2000; Kazancı et al., 2009; Nesemann and Neubert, 1999; Özbek and Sarı, 2007; Sağlam, 2011; Sağlam et al., 2008; Taşdemir et al., 2004; Ustaoğlu et al., 2003; Yıldırım, 2006). All exported leeches collected from the delta of River Kızılırmak in Turkey have been identified as *Hirudo verbena* (Sağlam, 2009). The two areas where leeches are harvested for commercial purposes on the first list, the Kizilirmak and Yesilirmak deltas on the Black Sea coast, account for 90% of the offtake destined for export in Turkey (CITES, 2006).

In this study was aimed to determine of the current state and the economic value of the medical leeches for Turkey and world.

MATERIALS AND METHODS

In this study, an evaluation was prepared as a result of studies carried out on the medical leech in the seven geographical regions of Turkey over many years. The distribution of medical leeches has been determined in studies of leech fauna carried out in different regions with different projects. Information on the prices of leeches have been obtained at negotiations with exporters of leech collectors. The quantities of leeches exported by exporting countries in the CITES database were taken, and evaluations of leech quota were made. In addition, regional leech studies conducted by other researchers were assessed on the wetlands basis.

RESULTS AND DISCUSSION

1. Population Status of Medicinal leeches

In the studies carried out in Turkey's wetlands was defined the existence of medicinal leech species. It was believed that collected and exported leeches from wetlands of Turkey was only belonging to *Hirudo medicinalis* species until 2014. But, the medicinal leech of Kızılırmak delta (Black Sea area, Turkey) that are vast majority of the leech exported from Turkey was determined to be *Hirudo verbana* (Sağlam, 2011). Exportation quota to

wildlife medicinal leeches are applied depending on Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) by the Turkey Ministry of Food, Agriculture and Livestock.

The most abundant species of medicinal leech in wetlands of Turkey is *Hirudo verbana*. However, in recent days, a new species of medical leech, *Hirudo sulukii* has been discovered in the South Eastern Anatolian Region of Turkey (Saglam et al. 2016). Medical leech exports have not been conducted to other countries from this region of Turkey so far.

2. General Trend of Medicinal leeches

Extensive international trade in *Hirudo medicinalis* was identified as a major threat to natural populations, so that it has been listed in Appendix II of the 1987 of CITES. Countries signing this agreement decided to place a quota on the collection and exportation of *Hirudo medicinalis*. For example, the export quota of medicinal leeches was 10 tons in Turkey in 1996, was reduced to 7 tons in 1997 and has since fluctuated between 2 and 8 tons. The export quota of *H. medicinalis* was given for the period between 2005 and 2010 as 6000 kg. The medicinal leech quota rate has been reduced by 1000 kg per year until from 2011 to 2014, and leech quota has been applied as 2000 kg between 2014 and 2016. The quota for leech exports has not been fully filled except 2005. The leech export quota was exported 100% in 2005 year. The amount of leech export and the rate decreased every year. Only portion 8,30% (166 kg) of the quota (2000 kg) permitted by the Ministry of Agriculture and Rural Affairs was able to be exported in 2015 (Table 1). As a consequence, all of the leech quota has not been exported, and exportation amount of medicinal leech have declined every year. These decreased shows that now medicinal leeches are not collected enough of our wetlands, and their population started to decrease in wetlands of Turkey.

Table 1. The export quotas and exported amount of medicinal leech reported by the exporter country (2000-2015) (CITES 2016).

Years	Quota (Kg)	Total quantity of reported leech by exporter country		Remarks
		kg	(%)	
2010	6000	1601.0	26,68	live or frozen, wild
2011	5000	485.2	9,70	live or frozen, wild
2012	4000	964.0	24,10	live or frozen, wild
2013	3000	511.0	17,03	live or frozen, wild
2014	2000	161.0	8,05	live or frozen, wild
2015	2000	166.0	8,30	live or frozen, wild

The use of medicinal leeches for treatment in clinics and hospitals in Turkey have been moved to the legal zone according to traditional and complementary medical practice regulations issued by the Ministry of Health in 2014 (Anonymous, 2014). This has greatly increased the use of medical leech in the country. Thus, medical leech export has been started to decline due to excessive use. However, this use must be carefully controlled in order to protect of medical leech species, and the use status of leeches in the country should be necessarily recorded. Another factor that is effective in reducing leech populations is the degradation of the quality of the habitats of the leeches, resulting in the drying of wetlands and the use of excessive pesticides in agricultural areas. Even if the world's latest technologies and facilities are used, it is not possible to prevent smuggling by a hundred percent. Another reason for this decline in the export of leeches is thought that medical leeches was taken away abroad from various routes without CITES document.

Table 2. Wholesale sales prices of medicinal leeches to exporters from collectors in Turkey.

Years	Wholesale prices (kg/$)				
	July	August	September	October	November
2010	111,35	121,46	141,70	202,43	371,12
2011	120,13	129,87	155,85	227,28	422,10
2012	121,39	132,95	156,10	208,10	433,53
2013	131,98	142,13	149,75	195,44	441,63
2014	157,66	180,18	202,70	238,74	427,93
2015	159,37	203,19	298,81	330,68	468,13

Table 3. Sales prices of the medicinal leech (*Hirudo* spp.) in some countries for exportation.

Country	Price (each leech) for 2016
Australia	5.84-8.00 $
Austria	4.60-5.60 €
Germany	5.80-7.00 €
Indonesia	1.50-2.00 $
Russia	3.00 €
Turkey	2.50-5.00 $
U.K.	4.00-12.00 £
USA	13.50-18.60 $

3. The Economic Importance of Medicinal leeches

Medicinal leeches are collected by teams of 15-20 people between July and November from wetlands of Turkey. The collected leeches are put into a bag made of cloth. According to weather conditions, one person can collect 1-3 kg leech per day. The price of 1 kg leech in the domestic market of Turkey varies between 159.37-468.13 USD. The

price of leeches is very high because of it is collected less in the wetlands in winter months (Table 2). Sales prices of the medicinal leech (*Hirudo* spp.) in some countries for exportation is shown in Table 3.

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Tibb Zəlilərinin Türkiyədə İqtisadi Əhəmiyyəti və Vəziyyəti

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Tibb zəliləri qədim dövrlərdən etibarən müəyyən xəstəlikləri müalicə etmək üçün tibbdə istifadə olunublar. Zəlilərin ən məşhur və geniş yayılmış tibbi növləri *Hirudo* cinsinə aiddir. Hazırki tədqiqatda Türkiyədə tibb zəlilərinin potensialı, vəziyyəti və iqtisadi əhəmiyyətini araşdırılmışdır. Son bir neçə ilə qədər, toplanmış və Türkiyədən ixrac olunan bütün tibb zəliləri *Hirudo medicinalis* kimi tanınmışdır. Amma Türkiyənin zəli ixracında əsasən Kızılırmak deltasında zəngin inkişaf edən *Hirudo verbana* zəlisidir. Türkiyənin Cənubi-Şərqi Anadolu bölgəsində son molekulyar tədqiqatlar nəticəsində tibb zəlisinin yeni bir növü müəyyən edilib - *Hirudo sulukii*. Tibb zəliləri Türkiyənin yeddi coğrafi bölgəsində, demək olar ki, bütün bataqlıqlarda tapılır. Tibbi zəli ixrac kvotası (CITES) və Qida Əkinçilik və Türkiyə Heyvandarlıq Nazirliyi görə 2015-ci ildə 2000 kq tətbiq edilmişdir. Bununla belə, bu kvotanın yalnız 166 kq (8.3%) tibb zəlisi ixrac edilə bilər.

Açar sözlər: *Tibb zəlisi,Hirudo sulukii, Hirudo verbana, iqtisadi əhəmiyyəti, ixrac, Türkiyə*

Экономическое значение и состояние медицинской пиявки в Турции

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С древних времен медицинские пиявки используются в лечебных целях для лечения некоторых заболеваний. Наиболее известные и широко используемые медицинские виды пиявок встречаются в роду *Hirudo*. В этом исследовании был рассмотрен потенциал, состояние и экономическое значение медицинских пиявок на водно-болотных угодьях Турции. До последних нескольких лет считалось, что все лекарственные пиявки, собранные и экспортируемые из Турции, были *Hirudo medicinalis*. Но лечебная пиявка из дельты Кызылырмака, богатая подавляющим большинства пиявок, вывозимых из Турции, считалась *Hirudo verbana*. В недавнем молекулярном исследовании в Юго-Восточном Анатолийском регионе Турции был идентифицирован новый вид медицинской пиявки *Hirudo sulukii*. Почти во всех болотах из семи географических регионов Турции могут быть найдены медицинские пиявки. Были применены квоты на экспорт медицинской пиявки - 2000 кг в 2015 году в зависимости от Конвенции о международной торговле видами дикой фауны и флоры, находящимися под угрозой исчезновения (СИТЕС), Министерством продовольствия, сельского хозяйства и животноводства Турции. Однако только 166 кг (8,3%) этой квоты на пиявку можно было экспортировать.

Ключевые слова: *Медицинская пиявка, Hirudo sulukii, Hirudo verbana, экономическое значение, экспорт, Турция*