

## Updating historical record on brine shrimp *Artemia* (Crustacea: Anostraca) from Urmia Lake (Iran) in the first half of the 10<sup>th</sup> century AD

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Over the several years, the first scientific report of brine shrimp *Artemia* has been referred to 1755 by Schlösser as an "unknown insect" from Limington, England (Kuenen & Baas-Becking, 1938); but this was eventually updated to the late tenth century AD in 982, with reference to unknown Iranian geographer who has documented *Artemia* as a "worm" from Urmia Lake (Iran) in *Hudud Al-Alam (The Regions of The World, حدود العالم)* (Asem, 2008).

Recently, we have received unique codex of Estakhri (d. 951/957 AD, 10<sup>th</sup> C.), *Al-Masalik wa Al-*

*Mamalik (Roads and Kingdoms, المسالك و الممالك)*, in Persian language which is kept in the British Library (IO Islamic 1026). Estakhri has reported "aquatic dog" from Urmia Lake in his book. Explanation of Urmia Lake in this manuscript has surely evidenced that his purpose was brine shrimp *Artemia* because of there is no other aquatic animal existing in this lake (see Asem et al., 2014). Figure 1 shows the folio 51v of *Al-Masalik wa Al-Mamalik* which describes Urmia Lake and accordingly pointing out *Artemia* inhabiting in this lake.

### Persian text:

...ذکر دریاهاى این دیار[:]: بادیایکان [به آنریایجان] دریایی هست که آنرا دریای ارمیه [ارومیه] خوانند، آبی شور دارد و هیچ جانوری نباشد و گویند که سگ آبی باشد[:]. گرد بر گرد این دریا همه عمارت و نواحی است و از این دریا تا مراغه سه فرسنگ باشد و تا ارمی [ارومیه] دو فرسنگ و درازای این دریا پنج روز است بر خشک و در آب چون باد راست بود بیک شب بیرون شوند...

Abu Ishaq Ibrahim Ibn Muhammad Farisi (b. ? d. 951/957 AD, 10<sup>th</sup> C.) aka Estakhri (استخری/اصطخری) from the ancient city of Estakhr (Fars Province, Iran), was a Persian geographer in the tenth century (Reza, 2000). He has written two books, first *Suwar Al-Aqaaleem (Figures of the Climes, صور الاقالیم)* and *Al-*

### English translation:

...the mention of seas in this region[:]: There is a sea in the Adarbaikan [Azerbaijan] called Ormiyeh Sea [Urmia Lake][.], has salt water and no animal but it is said there is a aquatic dog[.] buildings and areas [cities] are located around this sea and it is three Parasang [an ancient unit of length] from this sea to Maragheh and two Parasang to Ormi [Urmia] and the length of the sea is five days on overland and on the water, if wind was suitable, it will take a night...

*Masalik wa Al-Mamalik*. The original manuscripts of Estakhri did not survive, however a few old manuscript copies have been saved (Alai, 2014). Moeller (1839) and De Goeje (1870) republished the copies of *Suwar Al-Aqaaleem* and *Al-Masalik wa Al-Mamalik*, respectively in Arabic language. The content

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of those two books are quite similar, but *Al-Masalik wa Al-Mamalik* is more comprehensive than the other (Reza, 2000). There are several translated versions of

*Al-Masalik wa Al-Mamalik* in Persian language; although it seems the original text of this manuscript has been written in Persian (Krachkovskii, 1987).